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Revision 2
April 2003

Project # 23094

U.S. Department of Energy
Idaho Operations Office

Field Sampling Plan for the Remedial Action Sampling and Field Screening of Group 1 Sites at Waste Area Group 1, Operable Unit 1-10

INEEL
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Approved by

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ABSTRACT

This field sampling plan describes the Waste Area Group 1, Operable Unit 1-10, Group 1 remedial action field activities to be performed at the Idaho National Engineering and Environmental Laboratory for the Test Support Facility (TSF) -06, Area B and PM-2A Tank (TSF-26) sites. The field screening and sampling activities described in this plan are designed to support the remedial actions presented in the *Record of Decision for Test Area North, Operable Unit 1-10*, and are in accordance with the *Federal Facility Agreement and Consent Order for the Idaho National Engineering Laboratory*.

Data quality objectives for this sampling regime address sampling required to define the contamination areas. The results of this sampling will support subsequent soil removal actions and associated waste characterization, post-excavation confirmation sampling to ensure the final remediation goals have been met, and sampling to support Resource Conservation and Recovery Act closure of the tanks and piping associated with the PM-2A Tank system. This document additionally discusses sampling to obtain data for future waste disposal at the Idaho National Engineering and Environmental Laboratory Comprehensive Environmental Response, Compensation, and Liability Act Disposal Facility.

Together, this remedial action field sampling plan and the *Quality Assurance Project Plan for Waste Area Groups 1, 2, 3, 4, 5, 6, 7, 10, and Inactive Sites* constitute the sampling and analysis plan for the Waste Area Group 1, Operable Unit 1-10, Group 1 Sites remedial action. The field sampling plan provides guidance for the site-specific remedial action, including sampling, quality assurance, quality control, analytical procedures, and data management. Full implementation of the field sampling plan will help ensure that data are scientifically valid, defensible, and of known and acceptable quality. The quality assurance project plan describes project objectives and quality assurance/quality control protocols that will achieve the specified data quality objectives.

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TABLES

ACRONYMS

bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CLP	Contract Laboratory Program
COC	contaminant of concern
COPC	contaminant of potential concern
CY	calendar year
D&D	decontamination and decommissioning
D&D&D	deactivation, decontamination, and decommissioning
DAR	document action request
DOE	U.S. Department of Energy
DOE-ID	U.S. Department of Energy Idaho Operations Office
DOT	U.S. Department of Transportation
DQO	data quality objective
DS	decision statement
EPA	U.S. Environmental Protection Agency
ER	environmental restoration
ES&H	Environmental, Safety, and Health
FFA/CO	Federal Facility Agreement and Consent Order
FR	Federal Register
FRG	final remediation goal
FSP	field sampling plan
FTL	field team leader
GPRS	global positional radiometric scanner
HASP	health and safety plan

HPGe	high-purity germanium
HSO	health and safety officer
ICDF	INEEL CERCLA Disposal Facility
ID	identification
IDEQ	Idaho Department of Environmental Quality
IEDMS	Integrated Environmental Data Management System
IET	Initial Engine Test
IH	industrial hygienist
INEEL	Idaho National Engineering and Environmental Laboratory
L&V	limitations and validation
LOFT	Loss-of-Fluid Test
MCL	maximum contaminant levels
MCP	management control procedure
mrem/hr	milliroentgen-equivalent-man-per-hour
MQO	measurement quality objectives
NaI	sodium iodide
NLCI	no-longer-contained-in
OMP	Occupational Medical Program
OSHA	Occupational Safety and Health Administration
OU	operable unit
PCB	polychlorinated biphenyl
PE	project engineer
PM	project manager
POD	plan of the day
PPE	personal protective equipment
PQL	practical quantitation limit

PRD	program requirements directive
PSQ	principal study question
QA	quality assurance
QAPjP	Quality Assurance Project Plan
QC	quality control
RA	remedial action
RCRA	Resource Conservation and Recovery Act
RCT	radiological control technician
RD/RA	Remedial Design/Remedial Action
RD/RAWP	Remedial Design/Remedial Action Work Plan
RI/FS	remedial investigation/feasibility study
RML	Radiation Measurements Laboratory
ROD	Record of Decision
RRWAC	reusable property, recyclable materials, and waste acceptance criteria
RWMC	Radioactive Waste Management Complex
SAP	sampling and analysis plan
SE	safety engineer
SMC	Specific Manufacturing Capability
SMO	Sample Management Office
STL	sampling team leader
SVOC	semi-volatile organic compound
TAL	target analyte list
TAN	Test Area North
TBD	to be determined
TCLP	toxicity characteristic leaching procedure
TOS	task order statement of work

TPR	technical procedure
TSF	Technical Support Facility
UST	underground storage tank
VOC	volatile organic compound
WAC	Waste Acceptance Criteria
WAG	Waste Area Group

Field Sampling Plan for the Remedial Action Confirmation Sampling and Field Screening of Group 1 Sites at Waste Area Group 1, Operable Unit 1-10

1. INTRODUCTION

In accordance with the *Federal Facility Agreement and Consent Order* (FFA/CO) (DOE-ID [U.S. Department of Energy Idaho Operations Office] 1991), the U.S. Department of Energy (DOE) submits the following remedial action (RA) field sampling plan (FSP) for the Idaho National Engineering and Environmental Laboratory (INEEL), Waste Area Group (WAG) 1, Test Area North (TAN), Operable Unit (OU) 1-10, Group 1 Sites. Specifically, the four Group 1 Sites include the following:

1. The Soil Contamination Area South of the Turntable (Technical Support Facility [TSF] -06, Area B)

2. Soil excavation at the PM-2A Tanks (TSF-26)

3. Disposal Pond (TSF-07)

4. Fuel Leak site (Water Reactor Research Test Facility [WRRTF]-13).

This FSP will address two of the four sites: Soil Contamination Area South of the Turntable (TSF-06, Area B) and Soil Excavation at the PM-2A Tanks (TSF-26).

The TSF-07 Disposal Pond and the Fuel Leak site (WRRTF-13) will not be addressed further in this FSP. The Disposal Pond will not require RA confirmation sampling, because the remedy for the site is "No Further Action," and no soil excavation and subsequent confirmation sampling is necessary. The Fuel Leak site (WRRTF-13) will not require RA confirmation sampling because site concentrations are below risk-based levels determined from the State of Idaho Risk-Based Corrective Action guidance. Details of the Risk-Based Corrective Action analysis are discussed in Appendix G of the Group 1 Remedial Design/Remedial Action Work Plan (RD/RAWP) (DOE-ID 2000a) and also in the WRRTF-13 Calendar Year 2000 Summary Report (INEEL 2002a).

The remaining four OU 1-10 remedial action sites, and the TSF-26 tank, content removal will be addressed by a subsequent OU 1-10 Group 2 or Group 3 Sites Remedial Design/Remedial Action (RD/RA) Work Plan and supporting documents.

This FSP is implemented with the latest revision of the *Quality Assurance Project Plan for Waste Area Groups 1, 2, 3, 4, 5, 6, 7, 10, and Inactive Sites* (DOE-ID 2002a) and provides guidance for sampling, quality assurance (QA), quality control (QC), analytical procedures, and data management. Together, the quality assurance project plan (QAPjP) and this FSP constitute the RA sampling and analysis plan (SAP) for the WAG 1, OU 1-10, Group 1 Sites. The QAPjP describes project objectives and QA/QC protocols that will achieve the specified data quality objectives (DQOs). Use of this FSP will help ensure that data are scientifically valid, defensible, and of known and acceptable quality, while use of the QAPjP will ensure that the data generated are suitable for their intended purposes.

This RA SAP is identified as a secondary document under the FFA/CO and fulfills the specified FFA/CO requirements. The QAPjP and this FSP have been prepared pursuant to the *National Oil and Hazardous Substances Contingency Plan* (EPA 1990), the *Guidance for Conducting Remedial Investigations and Feasibility Studies under the Comprehensive Environmental Response, Compensation, and Liability Act* (EPA 1988), the FFA/CO (DOE-ID 1991), and Environmental Restoration (ER) management control procedure (MCP) -241, "Preparation of Characterization Plans."

1.1 Field Sampling Plan Objectives

The objective of this FSP is to guide the collection and analyses of sample data to support and direct the selected remedial actions presented in the *Final Record of Decision, Test Area North, Operable Unit 1-10* (DOE-ID 1999a) at two WAG 1, OU 1-10, Group 1 release sites, Soil Contamination Area South of the Turntable (TSF-06, Area B), and Soil Excavation at the PM-2A Tanks (TSF-26). The following sections describe the sampling locations that will be addressed by this FSP.

Based on the DQOs developed for sampling, data that needs to be addressed involve pre-remediation characterization and soil confirmation sampling within the two WAG 1, OU 1-10 Group 1 sites, specifically:

- TSF-06, Area B native soil area within fenced perimeter
- TSF-06, Area B ditch located alongside southern fence line
- TSF-06, Area B soil area surrounding PM-2A Tank feed lines
- TSF-06, Area B Snake Avenue northern shoulder, road bed, and asphalt
- TSF-26 native soil area within the perimeter fence, including soil outside eastern gate
- TSF-26 southern shoulder of Snake Avenue
- TSF-26 area immediately surrounding the PM-2A Tanks
- TSF-26 soil area surrounding PM-2A Tank feed lines
- TSF-26 debris located within the fenced perimeter.

The selected remedy provided in the OU 1-10 Record of Decision (ROD) for the Soil Contamination Area South of the Turntable (TSF-06, Area B), and the PM-2A Tank site (TSF-26), is "Excavation and Disposal." The final remediation goal (FRG) for these two sites is 23.3 pCi/g for Cs-137, (as established using INEEL standard risk assessment, documented in the OU 1-10 Remedial Investigation/Feasibility Study [RI/FS], and finalized in the ROD). This field sampling plan will address all identified data needs for the Group 1 remediation of TSF-06, Area B and TSF-26. Specifically, this FSP will guide pre-remediation characterization sampling of contamination areas to support subsequent soil removal actions and to comply with associated waste characterization requirements for future waste disposal at the INEEL Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Disposal Facility (ICDF), as discussed below. In addition, this FSP presents pre-remediation sampling of soils in the vicinity of tanks and piping associated with the PM-2A Tank system to support Resource Conservation and Recovery Act (RCRA) closure. Post-remediation confirmation sampling will follow planned surface soil and road base removals, as described in this FSP. When possible, consideration for field screening methods, as opposed to direct sampling, is provided.

1.2 Idaho National Engineering and Environmental Laboratory CERCLA Disposal Facility Requirements

This FSP will guide pre-remediation characterization sampling of contamination areas in support of subsequent soil removal actions. This will ensure that soils will meet associated waste characterization requirements for future waste disposal at the ICDF, reference dose limits, and MCPs.

The ICDF Complex is designed to provide centralized receiving, inspection, and treatment and segregation areas necessary to stage and store incoming waste from various INEEL Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) remediation sites prior to disposal to the ICDF landfill or evaporation ponds, or shipment off-Site. The ICDF landfill will accept only low-level, mixed low-level, hazardous, and limited quantities of Toxic Substances Control Act wastes generated from INEEL CERCLA activities for treatment and/or disposal at the ICDF Complex. Treatability testing can be used to determine whether the waste can be treated to meet the Waste Acceptance Criteria (WAC). Only INEEL CERCLA wastes meeting the appropriate Agency-approved WAC will be accepted at the ICDF Complex.

Additionally, wastes placed in the ICDF landfill must not cause groundwater in the Snake River Plain aquifer to exceed Idaho maximum contaminant levels (MCLs), 10^{-4} cumulative risk levels, or a hazard index of 1. The allowable concentrations of constituents in the waste soil that can be placed in the ICDF are calculated to be protective of groundwater. These concentrations are the lowest of the carcinogenic and noncarcinogenic risk-based concentrations and MCLs. The MCL calculations are performed separately from the risk-based calculations. The total risk allowable at the ICDF is also 10^{-4} cumulative carcinogenic risk and a hazard index of 1. Regulatory limits on radionuclide activity that can be disposed to the ICDF landfill are invoked by the ROD (DOE-ID 1999b) and DOE Order 435.1, as discussed in the ICDF landfill WAC (DOE-ID 2002b).

2. SITE BACKGROUND

This section provides an overview of the history, location and previous field activities conducted at this work site. Previous investigation data results are presented to characterize site conditions.

2.1 Site Description and History

The Idaho National Engineering and Environmental Laboratory (INEEL), a government-owned facility managed by the DOE, is located in southeastern Idaho, 51.5 km (32-miles) west of Idaho Falls, as shown in Figure 2-1. The INEEL encompasses approximately 2,305 km^2 (890 mi^2) of the northwestern portion of the eastern Snake River Plain, and extends into portions of five Idaho counties.

In November 1989, because of confirmed contaminant releases to the environment, the Environmental Protection Agency (EPA) placed the INEEL on the National Priorities List of the *National Oil and Hazardous Substances Contingency Plan* (54 FR [Federal Register] 48184). In response to this listing, the DOE, EPA, and the Idaho Department of Environmental Quality (IDEQ) (herein referred to as the Agencies) negotiated the FFA/CO and Action Plan. The Agencies signed these documents in 1991, establishing the procedural framework and schedule for developing, prioritizing, implementing, and monitoring response actions at the INEEL in accordance with CERCLA, RCRA, and the Idaho Hazardous Waste Management Act.

To better manage cleanup activities, the INEEL was divided into 10 WAGs. Test Area North, designated as WAG 1, includes fenced areas and immediate areas outside the fence lines at the TSF, the Initial Engine Test (IET) Facility, the Loss-of-Fluid Test (LOFT) Facility, the Specific Manufacturing Capability (SMC) Facility, and the WRRTF (DOE-ID 1999a).

As shown in Figures 2-1 and 2-2, TAN is located in the north-central portion of the INEEL. The facility was constructed between 1954 and 1961 to support the Aircraft Nuclear Propulsion Program, which developed and tested designs for nuclear-powered aircraft engines. When Congress terminated this research in 1961, the area's facilities were converted to support a variety of other DOE research projects. From 1962 through the 1970s, the area was principally devoted to the LOFT Facility, where reactor safety testing and behavior studies were conducted. Beginning in 1980, the area was used to conduct research and development with material from the 1979 Three Mile Island reactor accident (DOE-ID 1998). During the mid-1980s, the TAN Hot Shop supported the final tests for the LOFT Program. Current activities include the manufacture of armor for military vehicles at the SMC Facility, and nuclear storage operations at TSF. Decontamination and decommissioning (D&D) has recently been completed at the IET Facility.

The FFA/CO also established ten OUs within WAG 1 consisting of 94 potential release sites (DOE-ID 1999a). The sites include various types of pits, spills, ponds, aboveground and underground storage tanks (USTs), and a railroad turntable. A comprehensive RI/FS was initiated in 1995 to determine the nature and extent of the contamination at TAN under OU 1-10, defined in the FFA/CO as the *WAG 1 Comprehensive Remedial Investigation/Feasibility Study* (DOE-ID 1997). The OU 1-10 RI/FS culminated with the finalization of the OU 1-10 ROD (DOE-ID 1999a), which provides information to support remedial actions for eight sites where contaminants present an unacceptable risk to human health and the environment. This FSP addresses field activities at two of the Group 1 RD/RA sites:

- Soil Contamination Area South of the Turntable (TSF-06, Area B)
- Soil Excavation at the PM-2A Tank site (TSF-26).

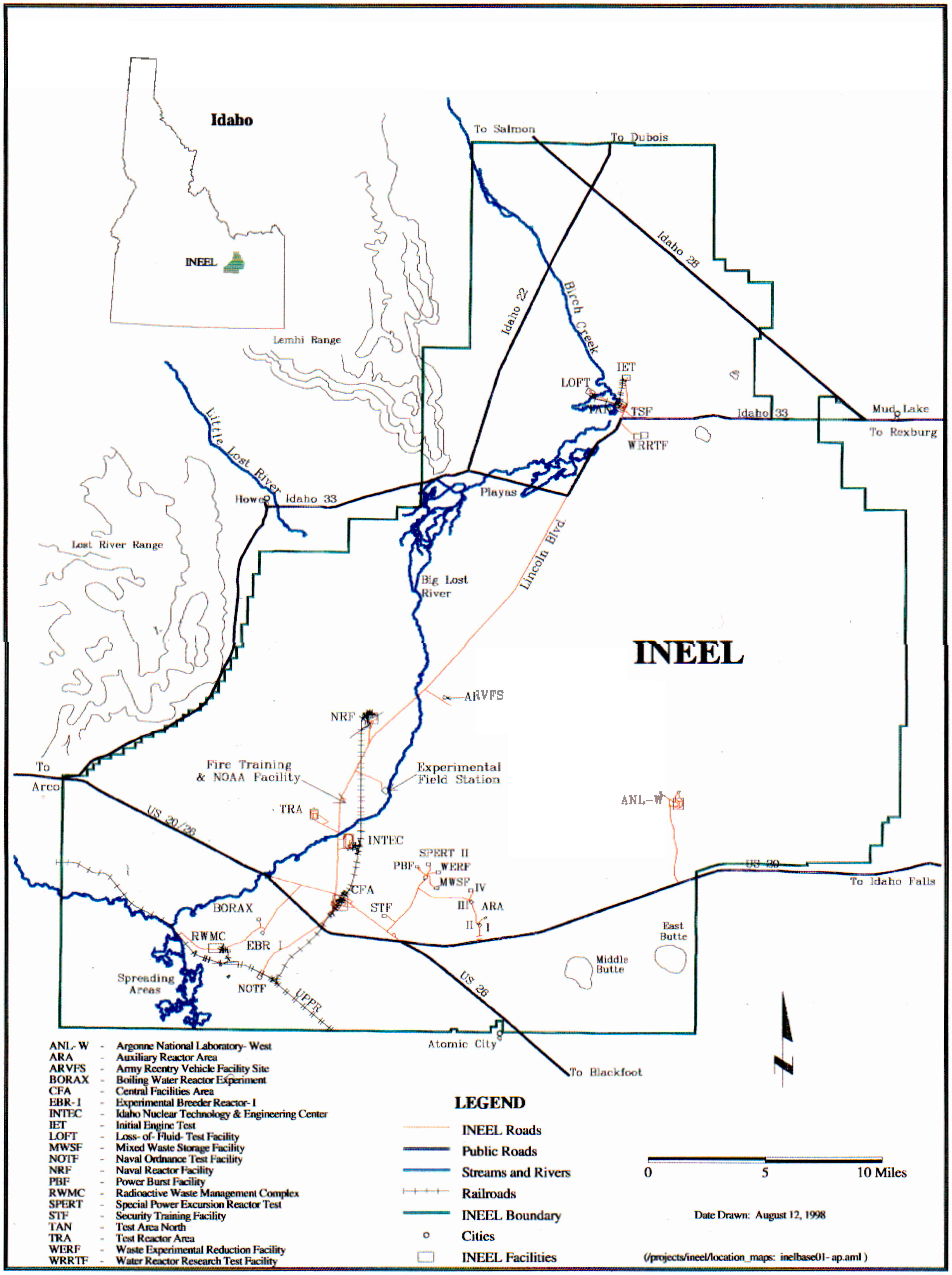

Figure 2-1. Location of the Idaho National Engineering and Environmental Laboratory.

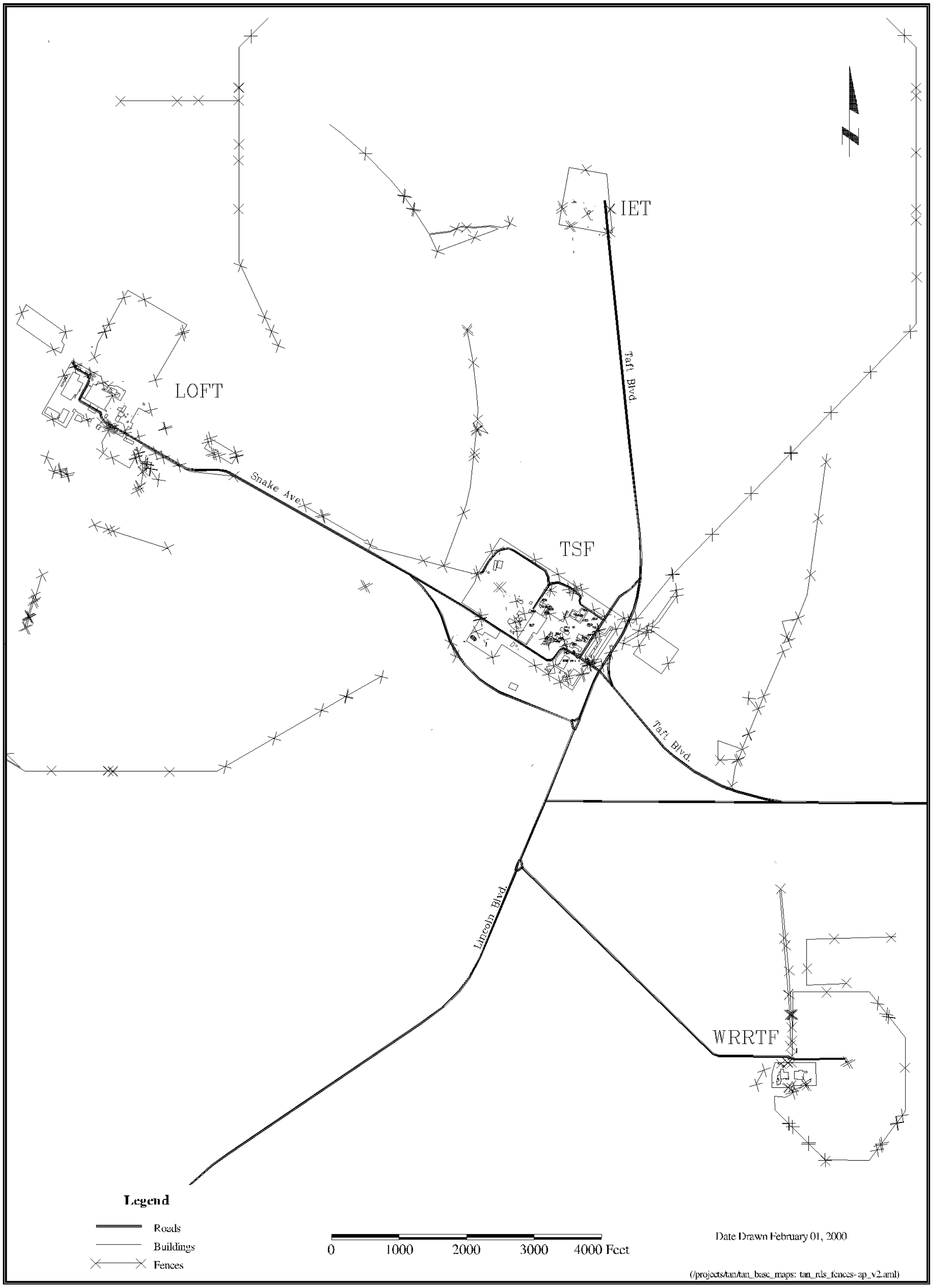

Figure 2-2. Waste Area Group 1, Test Area North Facilities.

The remaining sites are either covered by another decision document, were documented as "No Action" or "No Further Action" sites in the OU 1-10 ROD, or will be further evaluated by another WAG at the INEEL.

2.1.1 Soil Contamination Area South of the Turntable (TSF-06, Area B)

The TSF-06, Area B site is an open soil area bounded by the TSF fence on the west and facility roads and several adjacent structures on the east and south, as shown in Figure 2-3. This area is roughly triangular and measures approximately 205.8 m (675 ft) wide on the south by 129.6 m (425 ft) wide on the west.

Surface soils at TSF-06, Area B were radioactively contaminated by windblown deposition of radioactive particles from contaminated soils at the PM-2A Tanks site (TSF-26), located just south of TSF-06, Area B. Sampling and analysis data from the 1997 RI/FS (DOE-ID 1997) reported that the primary contaminants detected in the PM-2A Tanks included inorganics (antimony, arsenic, barium, beryllium, cadmium, chromium, lead, mercury, and silver), semi-volatile organic compounds (SVOCs) (bis[2-ethylhexyl]phthalate), polychlorinated biphenyls (PCBs), and radionuclides (Cs-137, Co-60, Eu-154, Sr-90, U-233/234, U-235, U-236, U-238, Pu-239/240, and Ni-63). Volatile organic compounds (VOCs) were not detected, although the detection levels were relatively high. However, based on the contaminant screening process for OU 1-05, TSF PM-2A Tanks, the only site contaminants of potential concern (COPCs) were Co-60 and Cs-137 (DOE-ID 1997).

Anecdotal information and photographs of the TSF-06, Area B site collected during more active TAN operational periods show a ditch parallel to Snake Avenue that runs through the TSF-06, Area B site. It was reported that the ditch periodically carried effluent from decontamination activities in the TAN-607 building and had the potential to contain radionuclides (Cs-137, Co-60, Eu-154, Sr-90), VOCs, SVOCs, PCBs, and metals.

Sampling results following a 1995 OU 10-06 removal action revealed that radioactive contamination remains in a 152-m × 30.5-m (500-ft × 100-ft) area, including the asphalt-paved Snake Avenue and roadbed. This area is referred to as the "remaining contamination at TSF-06, Area B" in Figure 2-3.

Residential screening results in the RI/FS indicate that the contaminant of concern (COC) for TSF-06, Area B is Cs-137. In addition, while thought unlikely, the possibility exists that other nonradionuclide contaminants associated with the PM-2A Tanks may have migrated to the TSF-06, Area B site via windblown contamination. Based on process knowledge, waste will be managed as RCRA-listed (F001).

2.1.2 PM-2A Tanks (TSF-26)

The PM-2A Tank site (TSF-26) consists of the contaminated soil area surrounding two abandoned USTs, designated as V-13 and V-14, but also known as TSF-709/710 or TSF-710A&B. The tanks are each 50,000-gal capacity, and are approximately 55 ft long and 12.5 ft in diameter. Installed in the mid-1950s, the tanks stored concentrated low-level radioactive waste from the TAN-616 Evaporator from 1955 to 1972 (DOE-ID 1997). In 1972, a new evaporator system (called the PM-2A System) was installed in the TSF-26 area to replace the existing TAN-616 Evaporator System, which was failing. The PM-2A Tanks served as feed tanks for the new evaporator system, in which liquid waste was evaporated, condensed, passed through an ion-exchange column, and discharged as clean water into the TSF-07 Disposal Pond. Because of operational difficulties and spillage, the system was shut down in 1975 (DOE-ID 1997).

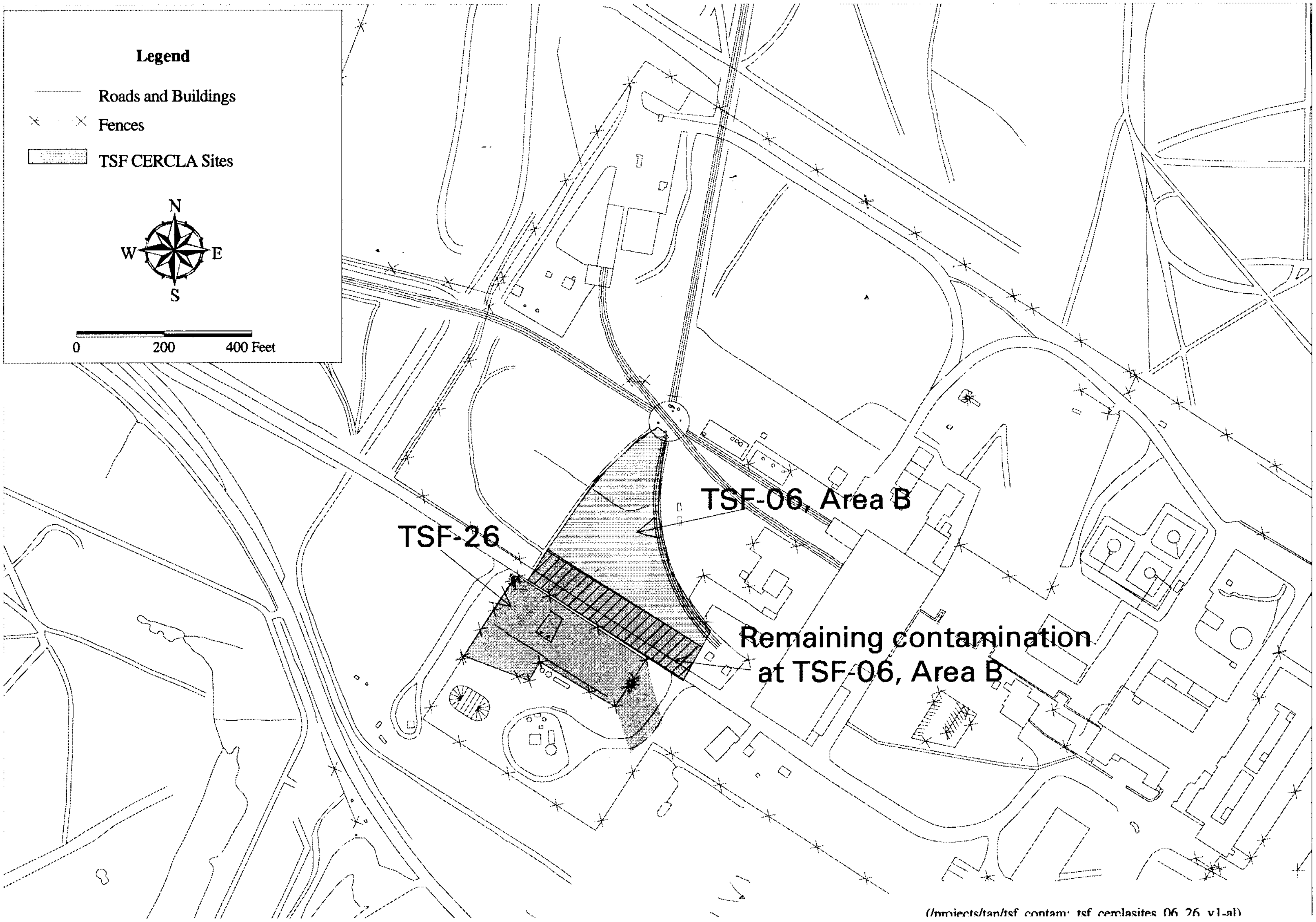

Figure 2-3. Soil Contamination Area South of the Turntable (TSF-06, Area B) and PM-2A Tank site (TSF-26).

During operations, the soil above the PM-2A Tanks was contaminated by spills containing radionuclides and hazardous constituents when waste was transferred from the tanks. The primary contaminants detected in the PM-2A Tanks are detailed in Section 2.1.1. In 1982, D&D of the PM-2A System was conducted. Most of the liquids in the PM-2A Tanks was pumped out into concrete containers, mixed with cement, and shipped to the Radioactive Waste Management Complex (RWMC) for burial. The residual liquid was absorbed by material incorporated into the tanks to absorb free liquid (DOE-ID 1997). The PM-2A System also includes a 1,100-ft run of two parallel 4-in. outside-diameter pipes that originated at TAN-616 and ultimately fed the two PM-2A Tanks. These feed lines, containing several elbows, were routed through the TSF-06, Area B under Snake Avenue into the PM-2A Tank area. During the 1982 D&D of the PM-2A Tanks, the piping was deactivated and characterized; however, the piping was left in place (EG&G 1983).

Numerous field screening, soil characterization, and remediation activities were conducted in the TSF-26 area since the 1982 D&D effort (see Section 2.2 for more detail). Residential screening results indicate that the COC for TSF-26 is Cs-137. In addition, the possibility exists that other nonradionuclide contaminants associated with the PM-2A Tanks may be present in the soil. Based on process knowledge, waste will be managed as RCRA-listed (F001).

2.2 Previous Investigations

The following sections describe in more detail the previous investigations that have been conducted at the TSF-06, Area B and TSF-26 sites.

2.2.1 Soil Contamination Area South of the Turntable (TSF-06, Area B)

Historical data and the results of the radionuclide analysis of composite surface soil samples were used in the evaluation of the Soil Contamination Area South of the Turntable (TSF-06, Area B) during the 1993 OU 1-05 Track 2 investigation. Investigations and interviews with personnel familiar with the history of site operations at TAN revealed that plastic sheeting had previously been installed over the native soil in TSF-06, Area B, followed by 0.3 m (1 ft) to 0.6 m (2 ft) of clean fill material (overburden). This material was installed by TAN Radiological Control (RadCon) personnel to shield the contaminated soils. It was determined later that the contamination in this overburden originated from windblown contamination from the PM-2A stockpiles (INEEL 2002b).

The evaluation indicated elevated Cs-137 levels in the soils. On the basis of the Track 2 risk evaluation, a nontime critical removal action under OU 10-06 was performed in 1995, resulting in a total of 2,092 m^3 (2,737 yd^3) of soil being removed from the 180-m × 90-m (600-ft × 300-ft) area. The average soil removal depth was 19 cm (7.5 in.), with a maximum of 45.7 cm (18 in.) of soil removed in the deepest excavation.

Following the OU 10-06 removal action verification, soil samples were collected from the surface within the excavated area and analyzed for gamma-emitting radionuclides. The activities of Cs-137 in the 27 samples were all below the preliminary remediation goal of 16.7 pCi/g used for the OU 10-06 removal action (DOE-ID 1997). However, radiological survey sampling results identified Cs-137 contamination within TSF-06, Area B with gamma radiation readings greater than 15 pCi/g (RI/FS radiological field screening action level) that had not been removed during the OU 10-06 removal action. The radiological field screening action level of 15 pCi/g was to provide a measure that the preliminary remediation goal (PRG) was met because field screening instrumentation was used. The Cs-137 concentrations in this area ranged from 48.3 pCi/g to 150 pCi/g.

During calendar year (CY) 2000, several additional field screening and sampling/analysis events were performed as part of post-ROD sampling to further understand the nature and extent of the windblown contamination originating from the TSF-26 PM-2A Tank site and to obtain analytical data to support remediation (INEEL 2002b). Following an April 2000 sampling event, remediation of the TSF-06, Area B site was performed in July 2000 to remove the top 6 in. of overburden from the site. The contaminated soil was bladed with a road grader then loaded into soft-sided soil bags with a front-end loader. The soil bags were temporarily stored in a CERCLA storage area prior to disposal.

In August 2000, remaining soil piles were windrowed, field screened, and sampled to determine whether the soil was above the FRG of 23.3 pCi/g for Cs-137. In situ measurements were performed using the DART/M1 gamma spectrometry system. Grab samples were collected with a spoon sampler at each measurement point on the windrows at surface and 6 in. below ground surface (bgs) (INEEL 2002b). Measurement points were located about 30 ft apart. These samples were then counted by conventional gamma spectrometry at the Idaho Nuclear Technology and Engineering Center (INTEC) laboratory.

The northern windrow showed Cs-137 concentrations consistently above 23.3 pCi/g at both 0 and 6 in. bgs. This indicated evidence of homogeneous contamination throughout the length and depth of the pile. The center windrow showed a small section of soil below 23.3 pCi/g, while the remainder of soil measured above 23.3 pCi/g for Cs-137. The third windrow was grab-sampled only; one sample exhibited levels above the 23.3 pCi/g level.

When the sample analyses were received, the last soil bags were filled with the windrowed soil and transported to the Radioactive Parts Security Storage Area (RPSSA) for interim storage. Following receipt of a no-longer-contained-in (NLCI) determination from IDEQ, all 75 soil bags filled at TSF-06, Area B (with an estimated total excavated volume of 555 yd^3) were shipped to the RWMC for disposal by December 2000.

Following excavation of the windrows, TSF-06, Area B was gridded, field screened, and sampled. With the use of the DART/M1 gamma spectrometry system, in situ measurements were again performed, both to scope the potential Cs-137 levels at the site and to ascertain the lateral and vertical extent of contamination. Segmented core sampling was conducted at 64 sampling points to develop the depth profile for the Cs-137 contamination. Detailed results of the field screening and analysis can be found in the TSF-06 and TSF-26 Calendar Year 2000 Summary Report (INEEL 2002b). The highest DART measurements occurred along the east side of the gridded area. In addition, due to the large field of view of the detector, contribution to the DART activity measurements from the adjacent PM-2A (TSF-26) area was highly likely.

Core samples were collected with a hand auger from the surface level of the overburden to 18 in. bgs at 6-in. intervals along four parallel rows. The samples were then analyzed for Cs-137 concentrations by conventional gamma spectrometry at the INTEC laboratory. Data results indicated that contamination concentrations were highest in the two southern rows closest to the Snake Avenue roadside. As shown in Table 2-1, 10 of the 64 samples collected from the surface level of the overburden exceeded the 23.3 pCi/g FRG for Cs-137 (25.4, 26.6, 36.1, 42.9, 64.7, 105, 107, 191, 537, and 538 pCi/g), and five samples collected from the 6-in. bgs interval exceeded the 23.3 pCi/g FRG for Cs-137 (35.6, 62.7, 63.1, 180, and 1139 pCi/g). No Cs-137 was detected at either the 12 or 18-in. intervals above the 23.3 pCi/g FRG.

Table 2-1. Selected results of final calendar year 2000 sampling of TSF-06, Area B.

Location	Sample Location Number	Cs-137 Results (pCi/g)	
		0 in. bgs	6 in. bgs
Row 1	29	25.4	---[a]
Row 3	62	26.6	---
Row 3	55	36.1	---
Row 3	50	---	180
Row 3	47	64.7	---
Row 3	39	42.9	---
Row 3	31	107	1139
Row 3	26	191	---
Row 3	18	105	62.7
Row 3	15	537	---
Row 3	10	538	63.1
Row 4	7	---	35.6

a. "---" indicates that the sample result did not exceed the 23.3 pCi/g FRG.

Little information is available about the history and purpose of the ditch located inTSF-26. The Track 2 report refers to it as a 20 × 40-ft open trench located east of the tank basin area. A radiation survey was conducted in 1993 along the bottom of the ditch and radiation measurements were collected every 10 ft (distance of 40 ft). Background radiation in the vicinity of the ditch ranged from 120 to 160 cpm; radioactive contamination detected within the ditch ranged from 8 to 840 cpm. Two areas of concern were the west end of the ditch just southwest of the TSF-26 tank basin and the east end of the ditch. The west end had historically received surface water flow from a north-south trending ditch (observed in historical photographs). The Track 2 report stated that the observed levels of radiation in the east end of the ditch might have been the result of residual contamination from D&D activities in the 1980s. Mobile radiation surveys indicated variable readings from 0.56 to .05 mR/hr along the length of the ditch. Subsequent shallow subsurface boring, field screening, and sampling were conducted in the west end of the ditch. In summary, the field screening data detected no alpha radiation, no VOCs above action limits, no mercury, and no beta/gamma activity greater than 100 cpm above background. Sample results collected from 0 to 5 ft bgs did not indicate that VOCs, SVOCs, PCBs, or radionuclides were present in the subsurface at a risk greater than 10-6 for any pathways. No staining was observed within the soil and all subsurface sample material was returned to the borehole.

2.2.2 PM-2A Tanks (TSF-26)

During the 1982 D&D of the PM-2A Tanks, the piping was deactivated and characterized, leaving the piping in place. Deactivation consisted of removing a section of each pipe adjacent to the TAN-616 facility and capping each pipe to prevent liquid leaving or entering TAN-616. In addition, the pipes were cut and capped near the PM-2A area to prevent liquid entering the tanks in the event there is an unidentified line joining either PM-2A feed line (EG&G 1983). No characterization was conducted at the PM-2A Tank location when the pipes were cut and capped.

There was no mention of the lines being flushed or drained of any residual waste liquids. When the pipes were cut and capped at TAN-616, a section of each pipe was retained and analyzed (designated north pipe and south pipe to differentiate characterization results). The inside pipe surface was found to be smooth and no debris was available for a determination of isotopic concentration. The radiation field inside each pipe was measured and gamma-emitting isotopes were identified. The north pipe section characterization results indicated Beta-Gamma Field (mR/h) at 100; Gamma Activity percentage was 72.6 for Cs-137 and 27.4 for Co-60. The south pipe section indicated Beta-Gamma Field (mR/h) at 60; Gamma Activity percentage was 91.6 for Cs-137, 7.8 for Co-60, and 0.6 for Eu-154.

The most contaminated surface soil within the PM-2A boundaries (northeast corner) was removed, boxed into a total of 104 $2 \times 4 \times 8$-ft boxes, and transported to the RWMC for burial. Unexpected contaminated sludge was discovered during the earth moving. The sludge, buried about 3 ft deep in one location, was excavated, placed into three boxes, and shipped to RWMC for burial with the other contaminated soil boxes.

Following removal of the soil and sludge in 1982, the PM-2A area was graded and the surface was radiologically surveyed. When the survey showed elevated radiological activity, the entire PM-2A area was backfilled with clean soil. Approximately 20,000 ft^3 of gravelly soil, then 10,000 ft^3 of topsoil were hauled in, smoothed, and graded. The PM-2A area was fenced with a 6-ft high chainlink fence, and a 20-ft wide gate was installed along the east end of the area. Four concrete and brass markers were placed to designate the four corners of the concrete cradle in which the underground tanks reside. Manways to the underground tanks were covered to prevent the entrance of snow. Currently, a drainage ditch vegetated by sagebrush and planted with crested wheat grass traverses the area in an east-west direction south of the PM-2A Tanks.

The soils surrounding the PM-2A Tanks were evaluated in 1988 during a DOE environmental survey. Four borings were drilled near the PM-2A Tanks; radiological analyses were performed, which showed levels of Cs-137 contamination (1.7 to 120 pCi/g) in the soil to at least 5.2 m (17 ft) bgs (DOE-ID 1997).

In 1993, a Track 2 investigation was performed at the TSF-26 site (INEEL 1994). Information regarding the Track 2 investigation can be found in the Track 2 summary report (INEEL 1994), but is also summarized in the RI/FS (DOE-ID 1997). The Track 2 investigation included a high-resolution magnetic field survey to determine the location of buried metallic objects, including the USTs and the sandpoints. The sandpoints are small diameter, steel-cased monitoring points that extend into the bedding material for the USTs within the concrete cradle. Once found, the sandpoints were sampled and the samples were analyzed as part of the Track 2 investigation.

In addition, one deep and three shallow borings were completed and sampled, and grab samples from the surface were collected. Radiological analyses performed on the surface samples indicated elevated gross beta and gamma activities. Organic analyses for SVOCs, VOCs, and PCBs were conducted on the samples from the three shallow borings. No VOCs, SVOCs, or PCBs were detected in any of the soil samples from the Track 2 investigation (DOE-ID 1997).

Based on the results of the Track 2 investigation, a nontime critical removal action was performed at TSF-26 in 1995, during which contaminated soil above a 15 pCi/g field screening action level was removed. Three soil stockpiles with gamma radiation readings greater than allowed by the project work control documentation were left at the TSF-26 site. A composite sample, composed of cuttings from the surface to 9 m (30 ft) bgs, was collected and analyzed for gross beta activity, gross alpha activity, gamma activities, six Contract Laboratory Program (CLP) metals, CLP VOCs, CLP SVOCs, and PCBs. Results indicated an area 30.5 m $\times$ 21.3 m (100 ft $\times$ 70 ft) to 5.2 m (17 ft) bgs was contaminated with Cs-137 at levels that posed an unacceptable risk to human health and the environment (DOE-ID 1999a). No VOCs, SVOCs, or PCBs were detected in any of the soil samples.

During the same removal action, what appeared to be the top of a wooden box was discovered at the PM-2A Tank site. However, the box was not opened or investigated at that time. Also encountered were scattered debris concentrated along the northern perimeter fence. The debris included concrete, a galvanized steel culvert, railroad ties, wooden pallets, plywood, steel conduit and an old electric motor, all left in place.

In 1998, six sampling locations were selected to characterize the soils at the PM-2A Tank site. At each location, samples were collected with a split spoon sampler from three depth intervals: 0 to 0.8 m (0 to 2.5 ft), 1.5 to 2.3 m (5 to 7.5 ft), and 2.3 to 3 m (7.5 to 10 ft). These samples were then analyzed for CLP VOCs, toxicity characteristic leaching procedure (TCLP) VOCs, PCBs, and TCLP metals. No VOCs, PCBs, or metals were detected above background concentrations in the 1998 PM-2A Tank soil samples.[a]

In March 2000, the three soil stockpiles and the wooden box were sampled to obtain additional data to support remediation, obtain a NLCI determination for the soils, and provide necessary concentration data to proceed with the Group 1 remedial action. The samples of the soil stockpiles and wooden box were collected in accordance with the post-ROD field sampling plan (DOE-ID 2000b). Samples were analyzed for VOCs, SVOCs, PCBs, total metals, TCLP metals and radionuclides. Gross alpha and beta results were also obtained to provide information for the planned future disposal of these soils. Data results revealed nondetects for SVOCs and PCBs; some VOCs were detected at insignificant levels. Radionuclide results showed Cs-137 concentrations up to 3,600 pCi/g in the soil stockpiles, which were similar to the 4,400 pCi/g maximum sample result obtained during the OU 10-06 removal action, as documented in the RI/FS. Radionuclide sample results for the wooden box were significantly higher than the results for the soil stockpiles. The maximum Cs-137 concentration was 710,000 pCi/g from one sample location, suggesting that the wooden box served as some type of containment for soil with elevated concentration levels.

Following sampling and analyses, fieldwork began to containerize the soil stockpiles and wooden box material into soft-sided bags. The wooden box was excavated with a backhoe; the soil was placed into separate soil bags. An estimated total excavated volume of 144 yd^3 from the TSF-26 soil stockpiles and wooden box filled a total of 22 soil bags. These were stacked in the southwest portion of the TSF-26 site and later transported to the Radioactive Parts Security Storage Area (RPSSA) for interim storage. Following completion of follow-up sampling and remediation activities (winterization and decontamination of equipment), and receipt of a NLCI determination from the IDEQ, the containerized soil was transported to the RWMC for disposal by December 2000.

In August 2000, the latest radiological sampling event for TSF-26 was performed to obtain data results regarding the vertical nature and extent of contamination. Grab samples were collected at 6, 12, and 18-in. intervals throughout the TSF-26 site at 18 sample points spaced approximately 50 ft apart. As shown in Table 2-2, of the 18 sample points, five samples exceeded the 23.3 pCi/g FRG for Cs-137 at surface level (0 in.) (40.3, 41.7, 66.7, 104, and 184 pCi/g), and one sample exceeded the 23.3 pCi/g FRG for Cs-137 in the 0-6 in. interval (32.2 pCi/g). No Cs-137 was detected above the 23.3 pCi/g FRG at either 12 or 18-in. intervals.

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a. Hain, K. E., Department of Energy Idaho Operations Office, to W. Pierre, Environmental Protection Agency, Region X, and D. Nygard, Idaho Department of Health and Welfare, November 3, 1998, "Transmittal of Analytical Results and Limitations and Validation Reports for WAG-1 Surface Soil Sampling at the V-Tank and PM-2A Tank Sites," OPE-ER-169-98.

Table 2-2. Selected results of August 2000 sampling of PM-2A Tank site (TSF-26).

Sample Identification Number	Cs-137 Results (pCi/g)	
	0 in. bgs	6 in. bgs
8	41.7	---[a]
6	40.3	---
34	184	32.2
39	104	---
41	66.7	---

a. "---" indicates that the sample result did not exceed the 23.3 pCi/g FRG.

2.3 Nature and Extent of Contamination

The following section describes the nature and extent of contamination for the TSF-06, Area B and the PM-2A Tank (TSF-26) sites.

2.3.1 Soil Contamination Area South of the Turntable (TSF-06, Area B)

Previous field screening and sampling analyses confirmed that surface soil at TSF-06, Area B was radioactively contaminated by windblown deposition of radioactive particles from contaminated soil at the PM-2A Tank site (TSF-26), located just south of TSF-06, Area B. Areas of contamination are shown in Figure 2-3. Although previous removal actions were conducted in this area, Cs-137 contamination remains within an area approximately 30.5 m × 152 m (100 ft × 500 ft), which includes potentially contaminated soil underneath the adjacent Snake Avenue. Snake Avenue currently services traffic from SMC/LOFT to TSF facilities (DOE-ID 1998). The contamination alongside the road was identified at the completion of the OU 10-06 removal action with the use of a portable sodium iodide (NaI) scintillometer. The contamination was detected at levels greater than 15 pCi/g, the RI/FS field screening action level, and had not been removed during the OU 10-06 removal action (DOE-ID 1997).

Several additional field screening and sampling/analysis events were performed at TSF-06, Area B during CY 2000 to further understand the nature and extent of the windblown contamination resulting from the PM-2A Tank site and to obtain analytical data to support remediation. In August 2000, the TSF-06, Area B was field screened and sampled to scope the potential Cs-137 levels at the site and to ascertain the lateral and vertical extent of contamination. As shown in Table 2-1, core samples and DART measurement data detected Cs-137 contamination at or above the 23.3 pCi/g FRG only at the surface and 6 in. bgs. No Cs-137 was detected above the 23.3 pCi/g FRG at either the 12 or 18-in. intervals. The pattern of remaining contamination appears to be restricted to a small area along the southern edge of the TSF-06 perimeter fence near Snake Avenue.

The TSF-06, Area B site has been subjected to additional windblown contamination, albeit substantially reduced, from the PM-2A Tank site since CY 2000. However, it can be ascertained from the results of the CY 2000 sampling event that potential contamination at the site above the Cs-137 FRG is limited to the top 1 to 2 ft of soil.

2.3.2 PM-2A Tanks (TSF-26)

Previous sampling activities confirmed that contaminated surface soil containing Cs-137 surrounds the PM-2A Tanks and soil within the TSF-26 site fence. In addition, while previous sampling data do not support the findings, CERCLA maps maintained by the INEEL depict potential Cs-137 contamination potentially extending outside the eastern gate of the TSF-26 site, as shown in Figure 2-3.

The source or cause of the potential contamination that may exist outside the eastern gate of the TSF-26 site is not known. In 2000, truck mounted germanium detectors were passed over this area, and gamma radiation readings were found to be very low (INEEL 2002b). Sampling is needed to delineate the potential nature and extent of contaminant concentrations in this area.

Post-ROD radiological field screening and sampling conducted in August 2000 identified areas within the PM-2A Tanks site that exceeded the 23.3 pCi/g FRG for Cs-137. Segmented core samples were collected at 18 sampling points (from the surface of the native soil to 18 in. bgs at 6-in. intervals) to develop the depth profile for the Cs-137 contamination and ascertain vertical extent of contamination. As shown in Table 2-2, five samples collected at surface level (0 in.) and one sample collected at the 0 to 6-in. interval exhibited Cs-137 levels above the 23.3 pCi/g FRG. No Cs-137 was detected above 23.3 pCi/g at either the 12 or 18-in. intervals. Detailed results of the field screening and analysis can be found in the Group 1 RD/RAWP (DOE-ID 2000a).

3. SAMPLING AND DATA QUALITY OBJECTIVES

The data quality objectives (DQO) process, which is used to specify, qualitatively and quantitatively, the objectives for the data collected, was designed as a specific planning tool to establish criteria for defensible decision making and to facilitate the design of the data acquisition efforts. The DQO process is described in the EPA documents *Guidance for the Data Quality Objectives Process* (EPA 1994) and *Data Quality Objectives for Hazardous Waste Site Investigations* (EPA 2000). The DQO process includes seven steps, each of which has specific outputs. Each of the following subsections corresponds to a section in the DQO process, and provides only the output required for each step.

The following sections define data needs and DQOs for conducting the proposed field screening and sampling in support of future remediation of TSF-06, Area B and the PM-2A Tanks (TSF-26) sites. This FSP is used in conjunction with the QAPjP (DOE-ID 2002a) to present the functional activities, organization, and QA/QC protocols necessary to achieve the specified DQOs.

3.1 Problem Statement

The objective of DQO Step 1 is to use relevant information to clearly and concisely state the problem to be resolved (EPA 1994).

- Problem Statement: Radiological and chemical data for the TSF-06 and TSF-26 Group 1 Sites need to be more comprehensive to ensure that remediation alternative decisions (including possible waste disposal requirements for the ICDF landfill) can be made. In addition, chemical data to support the RCRA closure of the PM-2A Tanks and feed lines to the PM-2A Tanks through TSF-06, Area B and TSF-26 do not exist. At the completion of Group 1 remediation action, confirmation sampling is needed to ensure the Cs-137 FRG of 23.3 pCi/g is met.

3.2 Principal Study Questions and Decision Statements

This step in the DQO process identifies the decisions and the potential actions that will be taken based on the data collected. The study questions and their corresponding alternative actions will then be joined to form decision statements (DSs). The objective of this characterization activity is to answer the principal study questions (PSQs):

- PSQ #1: Is the nature of the TSF-06 and TSF-26 Cs-137 contamination that exceeds action levels adequately defined?

- PSQ #2: Is the extent of the TSF-06 and TSF-26 Cs-137 contamination that exceeds action levels adequately defined?

- PSQ #3: Are there adequate data to determine whether the wastes generated from the TSF-06 and TSF-26 areas during remedial action are acceptable for ICDF landfill disposal?

- PSQ #4: Are the nature and extent of RCRA contamination levels surrounding the PM-2A feed lines through TSF-06, Area B and TSF-26, and the PM-2A Tanks adequately defined to support RCRA closure?

- PSQ #5: Are there adequate data to determine whether the TSF-06, Area B and TSF-26 sites have met the Cs-137 FRG of 23.3 pCi/g following remedial action?

The Decision Statements (DSs) include the following:

- DS #1: The nature of the TSF-06 and TSF-26 soil contamination that exceeds Cs-137 action levels is adequately defined. For example:
  - Are the native soil, roadbed, asphalt, and debris clean or contaminated?
  - What is the nature of Cs-137 in these media?
- DS #2: The extent of the TSF-06 and TSF-26 soil contamination that exceeds Cs-137 action levels is adequately defined. For example:
  - What is the vertical and lateral extent of Cs-137 contamination in the roadbed and open areas if the soil is contaminated?
- DS #3: There are adequate data to determine whether the wastes generated from the TSF-06 and TSF-26 areas during remedial action are acceptable for ICDF landfill disposal. For example:
  - Will the contaminated soil, debris, and asphalt meet ICDF landfill WAC?
- DS #4: The nature and extent of RCRA contamination levels surrounding the PM-2A feed lines through TSF-06, Area B and TSF-26, and the PM-2A Tanks are adequately defined to support RCRA closure. For example:
  - Is the soil surrounding the PM-2A feed lines and PM-2A Tanks contaminated above acceptable risk-based levels?
  - What is the vertical and lateral extent of unacceptable risk-based levels of contamination surrounding the PM-2A feed lines and the PM-2A Tanks?
  - Is the nature and extent of unacceptable risk-based levels of contamination surrounding the PM-2A feed lines and the PM-2A Tanks such that RCRA clean closure cannot be achieved or is not advantageous for the sites?
- DS #5: There are adequate data to determine whether the TSF-06, Area B and TSF-26 Group 1 sites have met the Cs-137 FRG of 23.3 pCi/g, following remedial action.

Determinations of whether the TSF-06, Area B and TSF-26 areas contain radioactive and/or hazardous waste will be based on regulatory levels for each of the COCs. Data collected during this activity will be used to determine whether the COCs are present at levels above acceptable regulatory levels. Therefore, for this sampling effort, there are contaminant-specific numerical values for the action levels; i.e., for each CERCLA and RCRA COC, an action level is specified.

3.3 Decision Inputs

To resolve the DSs listed above, concentrations of the COCs from the soil, asphalt, and debris must be obtained (determined using analyses conducted in accordance with accepted analytical methods). These data may already exist or may be derived from computational or surveying/sampling and analysis methods. Analytical performance requirements, such as practical quantitation limits (PQLs), precision, and accuracy, are also identified for new data.

For this FSP, some additional analyses will be necessary at the TSF-06, Area B and TSF-26 sites to better characterize the material and to provide more complete, comprehensive information for excavation and/or disposal requirements. While the data previously collected for these areas were of sufficient "quality," the "quantity" and types of data are insufficient in some cases. No samples were collected and analyzed for those constituents (e.g., metals, VOCs, SVOCs, PCBs) required to support subsequent soil removal actions and to comply with associated waste characterization requirements for future waste disposal at the ICDF. Additional samples will need to be collected to ensure that data quantity is adequate.

Table 3-1 not only specifies the information (data) required to resolve the DSs, but also identifies whether these data already exist. For existing data, references are provided and a qualitative assessment indicates whether the data are of sufficient quality to resolve the corresponding decision statements. No reasonably expected contaminants are excluded from the COPC list (metals, radionuclides, VOCs, PCBs, and SVOCs). The qualitative assessment of the existing data was based on quality control (e.g., spikes, duplicates, and blanks), detection limits, and collection methods.

3.4 Basis For Setting The Action Level

The action level is the threshold value that provides the criterion for choosing between alternative actions. The basis for setting action levels for the contaminants at the TSF-06 and TSF-26 sites includes background levels and risk-based criteria.

3.5 Analytical Performance Requirements

Table 3-2 defines the analytical performance requirements (e.g., PQLs and precision) for the data that need to be collected to resolve DS #1 through DS #5. These performance requirements include the PQL, precision, and accuracy requirements for each of the potential contaminants.

3.6 Study Boundaries

The primary objectives of this step are to identify the population of interest, define the spatial and temporal boundaries that apply to each DS, define the scale of decision making, and identify practical constraints that must be considered in the sampling design. Implementing this step helps ensure that the sampling design will result in the collection of data that accurately reflect the true condition of the site under investigation. The study boundaries are described as follows:

- Study Boundaries: The spatial boundaries of concern for this study are confined to the native soil areas within the TSF-06 and TSF-26 perimeter fences and include the area outside the east gate of TSF-26; the roadsides, roadbed and asphalt of Snake Avenue; soil areas surrounding the PM-2A feed lines that pass through the TSF-06, Area B soil area to the two PM-2A Tanks within the TSF-26 area, soil and material surrounding the PM-2A Tanks, and miscellaneous debris contained within the TSF-26 perimeter fence.

No practical constraints are expected that would interfere with collecting adequate volume for this study. However, the radiological activity encountered may require limiting sample volumes submitted to the laboratories. The temporal boundary refers to both the timeframe over which each DS applies (e.g., number of years) and when (e.g., season, time of day, and weather conditions) the data should be optimally collected. While there are no temporal boundaries nor seasonal or daily constraints for DS #1 through DS #5, it is assumed that DS #1 through DS #5 will be completed in the 2003–2005 timeframe, which corresponds to the planned remedial action schedule for TSF-06, Area B and TSF-26.

Table 3-1. Required information and reference sources.

DS #	Remediation Site Component	Required Data	Does Data Exist?	Source Reference	Sufficient Quality	Additional Information Required?
1, 2, 3	TSF-06 Soil (native soil, ditch, Snake Avenue northern shoulder and road bed)	Metals	No		NA[a]	Yes
		VOCs	No		NA	Yes
		SVOCs	No		NA	Yes
		Radionuclides	Yes		Yes	Yes
		PCBs	No	INEEL 2002b	NA	Yes
1, 2, 3	TSF-06 Asphalt	Radionuclides	No		NA	Yes
		PCBs	No		NA	Yes
1, 2, 3	TSF-26 Soil (native soil, soil outside eastern gate, Snake Avenue southern shoulder	Metals	Yes	INEEL 1994	Yes[b]	Yes
		VOCs	Yes	DOE-ID 1997	Yes	Yes
		SVOCs	Yes	INEEL 2002b	Yes	Yes
		Radionuclides	Yes		Yes	Yes
		PCBs	Yes		Yes	Yes
3	TSF-26 Debris	Metals	No		NA	Yes
		VOCs	No		NA	Yes
		SVOCs	No		NA	Yes
		Radionuclides	No		NA	Yes
		PCBs	No		NA	Yes
4	PM-2A Tank feed lines through TSF-06, Area B and TSF-26	Metals	No		NA	Yes
		VOCs	No		NA	Yes
		SVOCs	No		NA	Yes
		Radionuclides	No		NA	Yes
		PCBs	No		NA	Yes
4	TSF-26 soil immediately surrounding the PM-2A Tanks, including within concrete cradle	Metals	No		NA	Yes
		VOCs	No		NA	Yes
		SVOCs	No		NA	Yes
		Radionuclides	No		NA	Yes
		PCBs	No		NA	Yes
5	TSF-06 Soil (native soil, ditch, Snake Avenue northern shoulder and road bed)	Radionuclides	No		NA	Yes
5	TSF-26 Soil (native soil, soil outside eastern gate, Snake Avenue southern shoulder)	Radionuclides	No		NA	Yes

a. Not applicable.

b. While the data is of sufficient quality, there is not sufficient quantity of data, and additional information is required.

PCB = polychlorinated biphenyl
SVOC = semi-volatile organic compound
TSF = Technical Support Facility
VOC = volatile organic compound

Table 3-2. Analytical performance requirements.

Analyte List	Survey/ Analytical Method	Preliminary Action Level	PQL	Precision Requirement	Accuracy Requirement
PCBs (CLP list)	SW 846 8082-GC	Background and risk-based levels	QAPjP (DOE-ID 2002a)	a	a
TCLP Metals (CLP list)	SW 846 1311/7470/7471/ 6010-ICP	Background and risk-based levels	QAPjP (DOE-ID 2002a)	± 30 %	70-130 %
Metals (CLP list)	SW 846 3050/7470/7471/ 6010-ICP	Background and risk-based levels	QAPjP (DOE-ID 2002a)	± 30 %	70-130 %
TCLP VOCs (CLP list)	SW 846 1311/8260-GCMS	Background and risk-based levels	QAPjP (DOE-ID 2002a)	a	a
VOCs (CLP list)	SW 846 8260-GCMS	Background and risk-based levels	QAPjP (DOE-ID 2002a)	a	a
TCLP SVOCs (CLP list)	SW 846 1311/8270-GCMS	Background and risk-based levels	QAPjP (DOE-ID 2002a)	a	a
SVOCs (CLP list)	SW 846 8270-GCMS	Background and risk-based levels	QAPjP (DOE-ID 2002a)	a	a
Radionuclides	Gamma spectroscopy, Gross alpha and beta, Sr-89/90	Background and risk-based levels	QAPjP (DOE-ID 2002a)	± 30 %	70-130 %

a. Precision and accuracy requirements for organics are indicated in the method associated with each analyte.

CLP = Contract Laboratory Program
GC = gas chromatograph(y)
GCMS = gas chromatography/mass spectrometry
ICP = inductively coupled plasma
PQL = practical quantitation limit
QAPjP = Quality Assurance Project Plan

3.7 Decision Rules

The objective of this step is to define statistical parameters of interest that characterize the population, specify the action level, and integrate previous DQO outputs into a single statement that defines the conditions that would cause the decision maker to choose among alternative actions. The decision rule typically takes the form of an "***If…then***" statement describing the action to take if one or more conditions are met.

The decision rules relevant to this activity include the following:

- ***If*** the maximum concentration for any COC is greater than the constituent-specific maximum concentration of a contaminant, ***then*** the material (e.g., soil, asphalt) from that specific area will be managed as containing radioactive or hazardous waste and such material will be shipped to the appropriate disposal facility for disposal. The amount of material that will require removal to meet FRGs will be based upon field sampling results. Excavation of soil will extend to the outermost or deepest sampling location that is below the Cs-137 FRG of 23.3 pCi/g to ensure that all potentially contaminated media is removed.

- ***If*** the maximum concentrations for any COC are less than the constituent-specific maximum concentration of a contaminant, ***then*** the material from that specific area (e.g., soil, asphalt) will not require remediation.

3.8 Decision Error Limits

Since analytical data can only estimate the true condition of the site under investigation, decisions based on measurement data could potentially be in error (i.e., decision error). For this reason, the primary objective of this step is to determine which DSs, if any, require a statistically based sample design. Determining the decision error limits specifies the decision-maker's tolerable limits on decision errors, which are used to establish performance goals for the data collection design.

Two types of decision errors can occur for characterization of soils, asphalt, and debris contained in the TSF-06 and TSF-26 sites:

- Determining that these materials do not display contaminants above regulatory levels when, in fact, this is true, or

- Determining that these materials display contaminants above regulatory levels when, in fact, this is not true.

Though the consequences for each decision error must be considered, the former decision error offers the more severe consequence, as the error could result in human health and/or ecological impacts. Following the sampling conducted in support of DS #1 through DS #5, each contaminant will be evaluated to determine whether it poses an unacceptable risk.

3.9 Design Optimization

The objective of this step is to present alternative data collection designs that meet the minimum data quality requirements specified in DQO Steps 1 through 6. A selection process is then used to identify the most resource-effective data collection design that satisfies all of the data quality requirements. For TSF-06 and TSF-26, radiochemical and chemical analyses will be the selected screening technology.

- Design optimization: *The outputs of the first six steps have been discussed previously.*

Following the sampling conducted to support DS #1 through DS #5, each contaminant will be evaluated to determine whether it poses an unacceptable risk. This FSP proposes a more comprehensive analysis of the compounds previously analyzed in the Track 2, OU 10-06 Removal Action and post-ROD investigation. Uniform coverage of each site is desirable, as is an equal likelihood of representatively sampling any location.

Available soil contamination data suggest that the material across the TSF-06, Area B and TSF-26 native soil areas is relatively consistent and low risk, in comparison to risk-based criteria. A reasonable strategy then is to collect the minimum number of samples from these areas that can ensure a reasonable probability of correctly concluding that the parameter exceeds the critical value when, in fact, it does. For the TSF-06 and TSF-26 sites, a random systematic statistical approach is suggested to provide a more comprehensive analysis of the compounds previously analyzed. Radiological field screening will be used in conjunction with laboratory analytical methods for waste profiling and RCRA closure concerns to obtain a more defensible and traceable data package.

3.10 Measurement Quality Objectives

The measurement quality objectives (MQOs) specify that measurements will meet or surpass the minimum requirements for data quality indicators established in the QAPjP (DOE-ID 2002a). As a result, the technical and statistical quality of these measurements must be properly documented. Precision, accuracy, method detection limits, and completeness must be specified for physical/chemical measurements. Additional analytical requirements are described qualitatively in terms of representativeness and comparability. Table 3-4 provides the MQOs established for the Group 1 remedial action sampling.

3.11 Data Validation

Data will be acquired, processed, and controlled prior to input to the Integrated Environmental Data Management System (IEDMS) per MCP-227, "Sampling and Analysis Process for Environmental Management Funded Activities." For the samples submitted to the analytical laboratory, all data will be validated to Level B, in accordance with the QAPjP (DOE-ID 2002a). Level B method data validation is a superficial process done to evaluate subcontractor conformance to both contractual and technical criteria; it is documented with a limitations and validation (L&V) report, consisting of data clarification and data appraisal, and is written by an analytical chemist or other technical expert performing data validation. The report documents any deficiencies in the data identified during the method data validation. A separate L&V report is required for each data package that undergoes method data validation.

Tier I data packages are suggested for all analyses so that Level A validation could be performed at a later date if determined necessary in the future. Level A method data validation is a thorough process done to evaluate subcontractor conformance to both contractual and technical criteria, and documented with an L&V report, consisting of data confirmation, data clarification, and data appraisal. Data confirmation is the process of correlating the reported data within a given data package to its corresponding raw data. When applicable, this correlation also includes data reduction—the process of transforming raw data into reported data. This process includes the implementation of all applicable unit conversion calculations and data adjustment from techniques employed to dilute or concentrate samples. A separate L&V report is required for each data package that undergoes method data validation.

A data limitation and validation report, including copies of chain-of-custody forms, sample results, and validation flags, will be generated for each sample delivery group. All data limitation and validation reports associated with a site will be transmitted to the EPA and IDEQ within 120 days from the last day of sample collection. All definitive data will be uploaded to the IEDMS.

The Sample Management Office (SMO) will ensure the data are validated to Level B, as specified. The analytical method data validation will be conducted in accordance with current INEEL SMO data validation procedures. Validated data are entered into the IEDMS.

Table 3-3. Operation Unit 1-10 Remedial Design/Remedial Action Group 1 Sites field sampling plan data quality objective.

Activity	Objective	Data Use	Measurement	Analytical Method
Soil Contamination Area South of the Turntable (TSF-06, Area B)				
Contamination delineation and waste profile for disposal for TSF-06 native soil area (north of Snake Avenue)	Conduct radiological field screening to locate and delineate the contaminated surface soil areas. Two field screening methods, GPRS and HPGe portable in situ gamma spectroscopy, will be used to locate areas of Cs-137 contamination. A NaI scintillometer will further refine locations of potential "hot spots." Composite surface samples at 6-in. intervals will be collected beneath the overburden/native soil interface from 0 to 18 in. bgs and analyzed onsite for Cs-137 using HPGe portable in situ gamma spectroscopy. Selected samples will be analyzed for gross alpha, gross beta, Sr-89/90, CLP VOCs, CLP SVOCs, TAL metals, and PCBs to develop a waste profile for disposal.	Determine areas requiring excavation (where Cs-137 exceeds the FRG of 23.3 pCi/g) and excavation depths to determine volume of excavation. Determine whether the soil, once excavated, would meet ICDF landfill WAC.	Gamma activity	GPRS
			Cs-137	HPGe portable in situ gamma spectroscopy
			Dose rate	NaI scintillometer
			Cs-137	HPGe portable in situ gamma spectroscopy /Gamma spectroscopy[a]
			Gross alpha/beta	Standard laboratory method
			Sr-89/90	Standard laboratory method
			CLP VOCs	SW 846 methods
			CLP SVOCs	SW 846 methods
			TAL metals	SW 846 methods
			PCBs	SW 846 methods
Contamination delineation and waste profile for disposal for TSF-06 soil area (within the storm water drainage ditch)	Shallow subsurface composite samples at 12-in. intervals will be collected in the ditch along the centerline from 0 to 4 ft bgs and analyzed onsite for Cs-137 using HPGe portable in situ gamma spectroscopy. Selected samples will be analyzed for gross alpha, gross beta, Sr-89/90, CLP VOCs, CLP SVOCs, TAL metals, and PCBs to develop a waste profile for disposal.	Determine areas requiring excavation (where Cs-137 exceeds the FRG of 23.3 pCi/g) and excavation depths to determine volume of excavation. Determine whether the soil, once excavated, would meet ICDF landfill WAC.	Cs-137	HPGe portable in situ gamma spectroscopy /Gamma spectroscopy[a]
			Gross alpha/beta	Standard laboratory method
			Sr-89/90	Standard laboratory method
			CLP VOCs	SW 846 methods
			CLP SVOCs	SW 846 methods
			TAL metals	SW 846 methods
			PCBs	SW 846 methods

Table 3-3. (continued).

Activity	Objective	Data Use	Measurement	Analytical Method
Contamination delineation and waste profile for disposal for TSF-06 Snake Avenue northern shoulder, roadbed and asphalt	Surface samples of the northern shoulder of Snake Avenue (0 to 2 ft) will be collected and analyzed for Cs-137. Selected samples will be analyzed for gross alpha, gross beta, Sr-89/90, CLP VOCs, CLP SVOCs, TAL metals, and PCBs to develop a waste profile for disposal. Composite samples of the roadbed at 24-in. intervals from 0 to 4 ft bgs will be collected and analyzed onsite for Cs-137 using HPGe portable in situ gamma spectroscopy. Selected samples will be analyzed for gross alpha, gross beta, Sr-89/90, CLP VOCs, CLP SVOCs, TAL metals, and PCBs to develop a waste profile for disposal. The asphalt plugs will also be analyzed for Cs-137, and selected samples will be analyzed for gross alpha, gross beta, Sr-89/90, and PCBs to develop a waste profile for disposal.	Determine areas requiring excavation (where Cs-137 exceeds the FRG of 23.3 pCi/g) and excavation depths to determine volume of excavation.	Cs-137	HPGe portable in situ gamma spectroscopy /Gamma spectroscopy
			Gross alpha/beta	Standard laboratory method
			Sr-89/90	Standard laboratory method
			CLP VOCs[b]	SW 846 methods
			CLP SVOCs[b]	SW 846 methods
			TAL metals	SW 846 methods
			PCBs	SW 846 methods
Contamination delineation and waste profile for disposal for TSF-06 PM-2A feed lines	Random samples will be collected by drilling to the pipe depth and collecting samples from ~6 inches to ~18 below the pipe depth (est. 12 to 15 ft). Samples will be analyzed for Cs-137, gross alpha, gross beta, Sr-89/90, CLP VOCs, CLP SVOCs, TAL metals, and PCBs to support RCRA closure. No field screening will be performed for gamma-emitting radionuclides.	Determine whether feed lines have leaked to the subsurface and whether the pipe should be excavated or can be decontaminated in place, if found not to have leaked, to achieve clean closure.	Cs-137	Gamma spectroscopy
			Gross alpha/beta	Standard laboratory method
			Sr-89/90	Standard laboratory method
			CLP VOCs[b]	SW 846 methods
			CLP SVOCs[b]	SW 846 methods
			TAL metals	SW 846 methods
			PCBs	SW 846 methods
TSF-06, Area B, Confirmation Field Screening	Conduct confirmation field screening following confirmation sampling and excavation to verify that the FRG for Cs-137 was met. No field screening will be performed for gamma-emitting radionuclides.	Determine whether excavated area can be backfilled with clean soil, and whether Snake Avenue can be repaved.	Cs-137	NaI scintillometer
				Gamma spectroscopy

Table 3-3. (continued).

Activity	Objective	Data Use	Measurement	Analytical Method
PM-2A Tanks (TSF-26)				
Contamination delineation and waste profile for disposal for PM-2A Tanks native soil area	Conduct radiological field screening to locate and delineate the contaminated areas within the TSF-26 soil area. Two field screening methods, GPRS and HPGe portable in situ gamma spectroscopy, will be used to locate areas of Cs-137 contamination. A NaI scintillometer will further refine locations of potential "hot spots." Composite surface samples at 6-in. intervals from 0 to 18-in. bgs will be collected and analyzed onsite for Cs-137 using HPGe portable in situ gamma spectroscopy. Selected samples will be analyzed for gross alpha, gross beta, Sr-89/90, CLP VOCs, CLP SVOCs, TAL metals, and PCBs to develop a waste profile for disposal.	Determine areas requiring excavation (where Cs-137 exceeds the FRG of 23.3 pCi/g) and excavation depths to determine volume of excavation.	Gamma activity	GPRS
			Cs-137	HPGe portable in situ gamma spectroscopy
			Dose rate	NaI scintillometer
			Cs-137	HPGe portable in situ gamma spectroscopy/Gamma spectroscopy[a]
			Gross alpha/beta	Standard laboratory method
			Sr-89/90	Standard laboratory method
			CLP VOCs[b]	SW 846 methods
			CLP SVOCs[b]	SW 846 methods
			TAL metals	SW 846 methods
			PCBs	SW 846 methods
Contamination delineation and waste profile for disposal for TSF-26 southern shoulder of Snake Avenue	Shallow subsurface samples (0 to 2 ft) will be collected and analyzed for Cs-137 using HPGe portable in situ gamma spectroscopy. Selected samples will be analyzed for gross alpha, gross beta, Sr-89/90, CLP VOCs, CLP SVOCs, TAL metals, and PCBs to develop a waste profile for disposal.	Determine areas requiring excavation (Cs-137 exceeds the FRG of 23.3 pCi/g) and excavation depths to determine volume of excavation.	Gamma activity	GPRS
			Cs-137	HPGe portable in situ gamma spectroscopy
			Dose rate	NaI scintillometer
			Cs-137	HPGe portable in situ gamma spectroscopy/Gamma spectroscopy
			Gross alpha/beta	Standard laboratory method
			Sr-89/90	Standard laboratory method
			CLP VOCs[b]	SW 846 methods
			CLP SVOCs[b]	SW 846 methods
			TAL metals	SW 846 methods
			PCBs	SW 846 methods

Table 3-3. (continued).

Activity	Objective	Data Use	Measurement	Analytical Method
Contamination delineation and waste profile for disposal for TSF-26 area immediately surrounding the PM-2A tanks	Composite samples will be collected at 2-ft intervals from 4 ft below existing ground surface to refusal (estimated to be 24 ft.) and analyzed for Cs-137 by in situ gamma spectroscopy. From each borehole, the bottom interval and the 2 intervals with the highest gamma spectroscopy levels will be analyzed for gross alpha, gross beta, Sr-89/90, CLP VOCs, CLP SVOCs, TAL metals, and PCBs to support RCRA closure.	Determine whether the tanks can be feasibly clean closed or how much contaminated media may require excavation to achieve clean closure.	Cs-137	Gamma spectroscopy
			Gross alpha/beta	Standard laboratory method
			Sr-89/90	Standard laboratory method
			CLP VOCs[b]	SW 846 methods
			CLP SVOCs[b]	SW 846 methods
			TAL metals	SW 846 methods
			PCBs	SW 846 methods
Contamination delineation and waste profile for disposal for PM-2A feed lines	Random samples will be collected by drilling to the pipe depth (est. 12 to 15 ft) and analyzed for Cs-137, gross alpha, gross beta, Sr-89/90, CLP VOCs, CLP SVOCs, TAL metals, and PCBs to support RCRA closure.	Determine whether feed lines have leaked to the subsurface and whether the pipe should be excavated or can be decontaminated in place, if found not to have leaked, to achieve clean closure.	Cs-137	Gamma spectroscopy
			Gross alpha/beta	Standard laboratory method
			Sr-89/90	Standard laboratory method
			CLP VOCs[b]	SW 846 methods
			CLP SVOCs[b]	SW 846 methods
			TAL metals	SW 846 methods
			PCBs	SW 846 methods
Waste profile for disposal for TSF-26 debris	Composite samples will be collected and analyzed for Cs-137, gross alpha, gross beta, Sr-89/90, TCLP VOCs, TCLP SVOCs, TCLP metals, and PCBs to develop a waste profile for disposal. Each composite sample will be from a unique media.	Determine appropriate disposal location for debris, based upon the waste profile.	Cs-137	Gamma spectroscopy
			Gross alpha/beta	Standard laboratory method
			Sr-89/90	Standard laboratory method
			TCLP VOCs	SW 846 methods
			TCLP SVOCs	SW 846 methods
			TCLP metals	SW 846 methods
			PCBs	SW 846 methods

Table 3-3. (continued).

Activity	Objective	Data Use	Measurement	Analytical Method
TSF-26, Confirmation Field Screening	Conduct confirmation field screening following confirmation sampling and excavation to verify that the FRG for Cs-137 was met.	Determine if excavated area can be backfilled with clean soil.	Cs-137	NaI scintillometer Gamma spectroscopy

a. Laboratory gamma spectroscopy performed for samples collected for waste profiling purposes and RCRA closure concerns.

b. VOCs and SVOCs will not be analyzed for the asphalt, as this media comprises organic compounds.

CLP = Contract Laboratory Program
FRG = final remediation goal
GPRS = global positional radiometric scanner
HPGe = high-purity germanium
ICDF = INEEL CERCLA Disposal Facility Area
NaI = sodium iodide
PCB = polychlorinated biphenyl
RCRA = Resource Conservation and Recovery Act
SVOC = semi-volatile organic compound
TAL = target analyte list
VOC = volatile organic compound

Table 3-4. Measurement Quality Objectives for TSF-06 and TSF-26 sites.

Measurement	Method	Validation[a]	Data uses	PA[b]	RQL[c]
PCBs	8082	Level B	Excavation extents and disposal	TOS[d]	TOS
Metals	3000/7000	Level B	Excavation extents and disposal	TOS	TOS
SVOCs	8270B	Level B	Excavation extents and disposal	TOS	TOS
VOCs	8260A	Level B	Excavation extents and disposal	TOS	TOS
Radionuclides	Lab procedures	Level B	Excavation extents and disposal	TOS	TOS

a. The data package will consist of sample result summaries and QC data to support the requested level of validation.

b. Precision/accuracy

c. Required quantification limits

d. Task order statement of work

4. SAMPLING ACTIVITIES

This section presents the required field screening, sample locations, and identification of the data needs and objectives required for conducting the RA sampling activities at the Soil Contamination Area South of the Turntable (TSF-06, Area B) and the PM-2A Tank site (TSF-26).

4.1 Quality Assurance/Quality Control Samples

In addition to primary project samples, quality assurance/quality control (QA/QC) samples will be collected to establish the quantitative and qualitative criteria necessary to support the remedial action decision process and to describe the acceptability of the data by providing information both comparable to and representative of actual field conditions. Quality assurance/quality control samples consisting of field blanks and equipment rinsate blanks will be used to determine field accuracy. Quality control (duplicate) samples are used to measure field precision. The QA/QC sample results will be evaluated as outlined in the QAPjP (DOE-ID 2002a). Table 4-1 provides an overview of QA/QC sample analysis for this sampling effort.

Table 4-1. The quality assurance/quality control samples.

QA/QC Sample Type	Comment
Duplicate	Field duplicates will be collected at a frequency of one per 20 samples
Field blanks	Field blanks will be collected at a frequency of one per 4 sampling days
Trip blanks	Trip blanks will be collected when volatile organic compound samples are taken at a frequency of one per 20 samples
Equipment rinsate	Equipment rinsate samples will be collected periodically to demonstrate that sample collection equipment has been fully decontaminated

4.2 Cesium-137 Indicator

Cesium-137 (Cs-137) is being used in this FSP as the indicator parameter to identify soils that require excavation and disposal. The source of contamination for these sites is the liquid waste from the PM-2A Tanks. The TSF-26 site soils were contaminated by spilling the liquid waste from the tanks onto the soil. Contamination was spread within TSF-26 and TSF-06, Area B by the windblown spread of contamination. In sampling conducted in CY 2000 of the TSF-26 stockpiles, results showed elevated levels of Cs-137 (over 3,000 pCi/g in the stockpiles and up to 710,000 pCi/g in the area identified as the wooden box) and extremely low (not detected or slightly above detection levels) levels of other contaminants (VOCs, PCBs, other radionuclides). Further, additional radiological sampling of both the TSF-26 and TSF-06, Area B sites in 2000 showed much lower levels of Cs-137 (e.g., in the hundreds of pCi/g as the maximum). Based upon this information, Cs-137 is the best contaminant to identify soils requiring excavation. The exception to this could potentially be the ditch within TSF-06, Area B, the PM-2A Tank feed lines in TSF-06, Area B and TSF-26, and the ditch within TSF-26. In these cases, the planned samples are identified as having a higher percentage of the total samples analyzed for the other COPCs (metals, VOCs, SVOCs, PCBs).

4.3 Sampling Locations

The following subsection identifies the intended sample locations, the types of samples (grab vs. composite) to be collected and the approach used to determine the depth at which samples will be collected. The SAP tables in Appendix A provide a summary of this information. In some cases, field screening and lithology will be used to determine sampling locations by depth. Tables 3-1 and 3-2 in the QAPjP (DOE-ID 2002a) include identification of the container volumes, types, holding times, and preservative requirements that apply to all soil and liquid samples being collected under this FSP. Two types of sampling will be conducted at TSF-06, Area B and TSF-26:

1. Pre-excavation (characterization) field screening and soil sampling of TSF-06, Area B native soil, roadbed and asphalt; and TSF-26 native soil and/or debris (includes analyses for waste profile and characterization to support RCRA closure of PM-2A Tanks and tank lines)

2. Confirmation sampling following removal of contaminated soil from any area listed above.

4.3.1 Soil Contamination Area South of the Turntable (TSF-06, Area B)

The following sections detail the field screening and sampling activities that will be conducted for the Soil Contamination Area South of the Turntable (TSF-06, Area B) remedial action.

4.3.1.1 Pre-excavation Soil Sampling. Based on previous field screening and sampling results, the COC at TSF-06, Area B is Cs-137 (above the 23.3 pCi/g FRG). Radiological field screening will be conducted using two field screening methods to identify areas with elevated Cs-137 concentrations. Biased samples (determined from the results of the first two field screening sampling steps) will be collected and submitted for a 20-minute gamma spectrometric analysis to evaluate Cs-137 concentrations in the soil, using field calibrated HPGe portable in situ gamma spectroscopy onsite; other samples will be analyzed at a fixed base laboratory.

The initial field screening will be conducted to locate and delineate the boundaries of the contamination areas. High areas of gamma activity will be documented using a GPRS. After the boundaries of the contaminated areas have been delineated, the areas will be scanned with an HPGe portable in situ gamma spectroscopy detector. If Cs-137 readings above 15 pCi/g (the field screening action level) are registered, the locations will be identified and marked with a pin flag or stake. These identified screening locations, which also represent the Cs-137 hot spots, will establish the limits for soil excavation.

The established excavation limits will be rescanned using a NaI portable scintillometer to more accurately identify the areas with the highest number of counts per second above background to refine the excavation limits. After the established excavation limits are rescanned and prior to soil removal activities, soil samples will be collected. The number of samples collected from the contaminated areas will be determined after field screening is conducted. These samples will be screened onsite using field-calibrated HPGe detectors to analyze soil cores for a 20-minute gamma spectrometric analysis. Additional samples collected for waste profiling and confirmation sampling will be shipped for laboratory analysis (see Appendix A) to provide a more defensible and traceable data package. Specific areas to be field screened and sampled at TSF-06, Area B include:

- TSF-06, Area B native soil area inside fenced perimeter (see Figure 4-1). Existing data from CY 2000 sampling and the OU 10-06 removal action show this area to have relatively low concentrations of Cs-137, indicating that only shallow excavation will likely be required. Therefore, the majority of sampling for this area will involve shallow subsurface beneath the overburden/native soil interface (0-18 in. bgs), with the exception of the area where an old storm water ditch ran through the area. (The sampling regime for this ditch is discussed below.) For the shallow subsurface sampling, hand augering will be conducted through the remaining overburden (variable depth) and plastic sheeting into the native soil underneath. Samples will be collected beneath the overburden/native soil interface from a depth of 0 in. (the overburden/native soil interface) to 18 in. (below the interface) in 6-in. intervals in the locations identified through field screening as having the highest radiological contamination. The overburden/native soil interface will be determined by the field team leader (FTL) by visual observation of soil type changes (e.g., change from gravelly material to a more silty soil) and the presence of yellow plastic. A total of 20 samples from each depth interval (for a total of 60 samples) will be collected and analyzed for Cs-137 onsite using field-calibrated HPGe detectors in situ gamma spectroscopy. Of the samples collected, 10 will be shipped to a laboratory and analyzed for waste profile development (gross alpha, gross beta, Sr-89/90, PCBs, CLP VOCs, CLP SVOCs, and target analyte list [TAL] metals). The 10 samples that are analyzed for waste profile development will be purposely biased toward the locations that yield the highest radiological field screening results.

- TSF-06, Area B ditch located alongside southern fence line (see Figure 4-1). Pre-remediation characterization will be conducted in the storm water drainage ditch that runs parallel with the TSF-06 southern fence line, rumored to have carried radioactively contaminated wastewater. The ditch is estimated to be 10 ft wide × 250 ft long × 2 to 3 ft deep. The overburden/native soil interface formed in this area when TAN radiological control personnel laid a sheet of yellow plastic over the northern shoulder of Snake Avenue (the southern side of TSF-06, Area B) slopes gradually downward away from the road, indicating that the interface exists in centerline of the ditch. The overburden/native soil interface will be determined by the FTL by visual observation of soil type changes (e.g., change from gravelly material to a more silty soil) and the presence of yellow plastic. A total of 24 composite samples will be collected from six locations established along the centerline of the ditch, collected at 1-ft intervals from the overburden/native soil interface to at least 4 ft (0 to 12 in., 12 to 24 in., 24 to 36 in., and 36 to 48 in. intervals) beneath the interface, or the depth beneath the interface that Cs-137 concentrations are below the 23.3 pCi/g FRG, whichever is greater. Sampling will continue at step-out locations (horizontally) 1 ft either to the south or north of the ditch (randomly) at the same depth interval as the highest Cs-137 result from the vertical sample results. Samples will be analyzed onsite for Cs-137 using HPGe portable in situ gamma spectroscopy. Of the samples collected, 8 will be shipped to a laboratory and analyzed for waste profile development (gross alpha, gross beta, Sr-89/90, PCBs, CLP VOCs, CLP SVOCs, and TAL metals. The eight samples selected for waste profile development will be purposely biased toward the locations (centerline of the ditch or step-out samples) that yield the highest radiological field screening results.

- TSF-06, Area B soil area surrounding PM-2A Tank feed lines (see Figure 4-2). The PM-2A piping was deactivated and characterized, leaving the piping in place. Deactivation consisted of removing a section of each pipe adjacent to TAN-616 and capping each pipe to prevent liquid leaving or entering TAN-616. In addition, the pipes were cut and capped near the PM-2A area to prevent liquid entering the tanks in the event there is an unidentified line joining either PM-2A feed line. There was no mention of the lines being flushed or drained of any residual waste liquids in the D&D report. Additionally, the elbow joints of the feed lines were welded, not flanged, so there is no reason to believe these joints failed. Pre-remediation characterization will be conducted prior to excavation of the pipe run where the two feed lines from TAN-616 leading to the PM-2A Tanks were routed through the TSF-06 and TSF-26 soil areas. These data will be used to determine whether the pipe needs to be excavated to achieve clean closure, or if it can be decontaminated in place. A total of six samples will be collected using conventional drilling methods from approximately 6 in. above the pipe to approximately 18 in. below the pipe by drilling to the pipe depth (estimated to be 12 to 15 ft.) through the native soil and as close to the pipe as is safe and meets INEEL work control processes. In general, INEEL work control processes require a subsurface clearance for drilling, which includes the use of ground penetrating radar when warranted. In the case of the feed lines, ground penetrating radar or other metal detection devices will be used to guide the drill rig. One biased sample location will be established at the location where the lines into the PM-2A tanks were cut and capped (north of Snake Avenue) during the 1982 D&D effort. The six samples will be collected and analyzed at a laboratory for gamma spectroscopy, gross alpha, gross beta, Sr-89/90, PCBs, CLP VOCs, CLP SVOCs, and TAL metals.

- TSF-06, Area B Snake Avenue northern shoulder, roadbed and asphalt (see Figure 4-3). Pre-remediation characterization for windblown contamination will be conducted in the narrow (15 × 500 ft) strip of soil along the northern shoulder of Snake Avenue, adjacent to the TSF-06 fence line. A total of 10 shallow subsurface samples will be collected from the 0 to 2 ft depth interval and analyzed onsite using field calibrated HPGe portable in situ gamma spectroscopy. Of the 10 samples, two will be shipped to a contract laboratory and analyzed for waste profile analysis (gross alpha, gross beta, Sr-89/90, PCBs, CLP VOCs, CLP SVOCs, and TAL metals). The two samples selected for waste profile development will be purposely biased toward the locations that yield the highest radiological field screening results.

- Subcontractor drilling services will be procured to collect samples from the TSF-06 Snake Avenue roadbed and asphalt. Ten boreholes will be drilled and samples will be collected by pushing a core sampler through the asphalt to a depth of 4 ft into the roadbed soil (see Figure 4-3). A total of 10 samples will be collected from the 0 to 2-ft interval, and 10 samples will be collected from the 2 to 4-ft interval and analyzed onsite using field calibrated HPGe portable in situ gamma spectroscopy. Of the 20 total samples, five will be selected for waste profiling analysis to be performed at a contract laboratory (gross alpha, gross beta, Sr-89/90, PCBs, CLP VOCs, CLP SVOCs, and TAL metals). The five samples selected for waste profile development will be purposely biased toward the locations that yield the highest radiological field screening results. From the 10 cores obtained from soil sampling, the asphalt plug will also be analyzed onsite using gamma spectroscopy. Half of the asphalt plugs (five) will be shipped to a contract laboratory and analyzed for waste profiling analysis (gross alpha, gross beta, Sr-89/90, and PCBs); the five samples selected will be biased toward the locations that yield the highest radiological field screening results. Volatile organic compounds (VOCs) and SVOCs will not be analyzed for the asphalt, as this media comprises organic compounds.

4.3.1.2 Confirmation Sampling. Following excavation at TSF-06, Area B, including overburden and native soil areas north of Snake Avenue, asphalt, and road bed (based upon characterization results), confirmation screening/sampling will be conducted to verify that all contamination exceeding the 23.3 pCi/g FRG for Cs-137 has been removed. The bottom of each excavated area will be scanned with a NaI portable scintillometer to more accurately identify the areas with the highest number of counts per second above background to define the locations of the confirmation samples. Confirmation samples will be collected from each excavated area to ensure that contaminated soil was removed. These samples will be biased toward areas where the NaI portable scintillometer identifies the highest counts above background, if any. All samples could be analyzed onsite using field-calibrated systems, but will be submitted to the INEEL Radiation Measurements Laboratory (RML) for a 20-minute gamma spectrometric analysis to ensure the FRG has been achieved. If results from confirmation sampling indicate soil concentrations that exceed the 23.3 pCi/g Cs-137 FRG, additional excavation and subsequent confirmation resampling will be necessary.

At this time, confirmation sampling for the pipe through TSF-06, Area B to the PM-2A Tanks is not included in this FSP. Based upon the results of pre-remediation characterization, a decision will be made regarding whether this pipe will be removed or decontaminated in place to support RCRA clean closure. If pipe removal is selected, this document will be revised to include confirmation sampling underneath the removed pipe.

4.3.2 PM-2A Tanks (TSF-26)

Field screening and sampling procedures for TSF-26 soils will be similar to those used for TSF-06, Area B, as described below.

4.3.2.1 Pre-excavation Soil Sampling. This sampling effort will include the following areas:

- TSF-26 native soil area within the perimeter fence, including soil outside eastern gate (see Figure 4-4). Existing data from CY 2000 sampling and the OU 10-06 removal action show this area to have relatively low concentrations of Cs-137, indicating that only shallow excavation will likely be required. Therefore, the majority of sampling for this area will involve shallow subsurface (0 to 18 in. bgs), with the exception of the PM-2A Tanks and PM-2A Tank feed lines, and the drainage ditch located south of the PM-2A Tanks. Twenty-five sample locations have been randomly established throughout the TSF-26 site, and composite samples will be collected and analyzed onsite using field calibrated HPGe portable in situ gamma spectroscopy at each of the locations from 0 to 6 in., 6 to 12 in., and 12 to 18 in. These sample locations will be staggered from those sample points previously sampled in 2000. Of these 75 total samples, 10 will be selected and analyzed at a contract laboratory for waste profile analysis (gross alpha, gross beta, Sr-89/90, PCBs, CLP VOCs, CLP SVOCs, and TAL metals). The 10 samples selected will be biased toward the locations that yield the highest radiological field screening results.

  In addition, six sample locations will be identified along the drainage ditch in the southern portion of the TSF-26 area and composite samples will be collected from 0 to 12 in., 12 to 24 in., and 24 to 36 in. at each of these locations and analyzed onsite using field calibrated HPGe portable in situ gamma spectroscopy. Of these 18 total samples, four will be selected and analyzed at a contract laboratory for waste profile analysis (gross alpha, gross beta, Sr-89/90, PCBs, CLP VOCs, CLP SVOCs, and TAL metals). The four samples selected will be biased toward the locations that yield the highest radiological field screening results.

- TSF-26 southern shoulder of Snake Avenue (see Figure 4-5). Pre-remediation characterization for windblown contamination will be conducted in this narrow (15 × 500 ft) strip of soil along the southern shoulder of Snake Avenue, from the edge of the asphalt to the PM-2A fenceline. A total of 10 shallow subsurface samples will be collected from the 0–2 ft-depth interval and analyzed onsite by gamma spectroscopy. Of the 10 samples, two will be analyzed at a laboratory for waste profile analysis (gross alpha, gross beta, Sr-89/90, PCBs, CLP VOCs, CLP SVOCs, and TAL metals). The two samples selected will be biased toward the locations that yield the highest radiological field screening results.

- TSF-26 area immediately surrounding the PM-2A Tanks (see Figure 4-6). Pre-remediation characterization will be conducted to evaluate tank cradle backfill material and associated surrounding soils. Subcontractor drilling services will be procured to collect soil samples in the cradle bedding material and in the soils alongside the cradles (at an elevation beneath the cradles) using conventional drilling techniques. Figure 4-7 provides a cross-sectional diagram of the PM-2A Tanks. As an option to this sampling design, the project may consider using the INEEL Downhole measurement system to allow for real-time depth and lateral profile of the radioactive contaminants. This system could provide 3-D subsurface maps of the radiation profile. If this system is used, it would be in addition to the analytical techniques described in this document.

  Samples from the tank bedding material should be obtained first, using the following methods. Two borehole locations will be established adjacent to the sandpoint locations (which may require location by geophysical techniques). As the borehole is advanced, composite soil samples will be collected in 2-ft intervals from 4 ft below existing grade to refusal (estimated to be 24 ft below existing grade). The sample intervals from each of the two boreholes would be analyzed for gamma spectroscopy (in situ). The deepest interval (in the bedding material) and the two intervals from each borehole with the highest Cs-137 activity (as determined by in situ gamma spectroscopy) would be analyzed for gross alpha, gross beta, Sr-89/90, PCBs, CLP VOCs, CLP SVOCs, and TAL metals. Preferably, the entire core would be retrieved, which would allow for visual observation and logging, radiological field screening of the entire length, and other pertinent observations. These observations would be recorded in the sampling logbook but are not required by this FSP.

Drilling and sampling would be accomplished using conventional drilling methods. Once refusal is encountered, a sample would be collected of the tank bedding material. The bedding material sample would be the layer immediately above this elevation, and, providing that the sandy material is cohesive or moist, sufficient sample material shall be retrieved and analyzed for gamma spectroscopy, gross alpha, gross beta, Sr-89/90, PCBs, CLP VOCs, CLP SVOCs, and TAL metals. If sufficient bedding material is not obtained, the drill rig should move slightly to the outside of the sandpoint locations and advance a new borehole to the bedding material depth to obtain sample material from another, similar location. Extreme caution should be used to minimize disturbance of the bedding material and to maximize sample media retrieval. The same sampling process shall be used for both boreholes into the tank bedding material.

To determine whether the PM-2A Tanks concrete cradle has leaked, four additional boreholes will be drilled in the same manner as those described above. The four boreholes will be located just outside of the concrete cradle (approximately 2 to 3 ft recommended), the outline of which can be determined in the field by locating the four permanent brass markers that delineate the corners of the subsurface concrete cradle. As each borehole is advanced, composite soil samples will be collected in 2-ft intervals from 4 ft below existing grade to refusal.

These sample intervals from each of the two boreholes would be analyzed for gamma spectroscopy (in situ). The deepest interval and the two intervals from each borehole with the highest Cs-137 activity (as determined by in situ gamma spectroscopy) would be analyzed for gross alpha, gross beta, Sr-89/90, PCBs, CLP VOCs, CLP SVOCs, and TAL metals. Preferably, the entire core would be retrieved, which would allow for visual observation and logging, radiological field screening of the entire length, and other pertinent observations.

The borehole would be then be advanced to a depth bgs that is no greater than 10 ft below the measured depth where the concrete cradles were encountered in the first two boreholes, or when refusal is reached, whichever comes first. Sample collection would begin at the same depth bgs as the measured depth to the concrete cradles to refusal (basalt). Coring would continue. Once refusal is reached, all sample core material should be removed from the auger flight, ensuring that samples are representative. With the auger flight left in place to serve as a temporary casing, it is recommended that the drilling subcontractor use a diamond tip core barrel to core several feet into the refusal layer to ensure that it is basalt, as thought.

All boreholes should be filled or grouted shut to prevent precipitation from getting down into the borehole and mobilizing contaminants. All drill cuttings should be properly containerized. Decontamination of auger flights between holes and decontamination of the split barrel sampler device after every use will ensure that cross-contamination does not occur.

- TSF-26 soil area surrounding PM-2A Tank feed lines (see Figure 4-2). Pre-remediation characterization will be conducted prior to excavation of the pipe run where the two feed lines from TAN-616 leading to the PM-2A Tanks were routed through the TSF-06 and TSF-26 soil areas.

These data will be used to support whether the pipe needs to be excavated to achieve clean closure or can be decontaminated in place. Samples will be collected using conventional drilling techniques by drilling to the pipe depth (estimated at 12 to 15 ft) through the native soil at random locations. The sample locations will be placed as near to the pipe as is safe and will meet the INEEL work control processes. A total of six samples will be collected from ~6 in. above the pipe to ~18 in. below the pipe, and will be analyzed onsite using field calibrated HPGe portable in situ gamma spectroscopy. These six samples will also be analyzed at a contract laboratory for gamma spectroscopy, gross alpha, gross beta, Sr-89/90, PCBs, CLP VOCs, CLP SVOCs, and TAL metals in the case that the PM-2A feed lines leaked and potential contaminants were released into the soil.

- TSF-26 debris located within the fenced perimeter (see Figure 4-4). Debris scattered throughout the TSF-26 soil area includes a galvanized metal culvert, concrete, conduit, wooden pallets, railroad ties, and an old electric motor. A total of eight composite samples will be collected using hand tools (snippers, chisel, hammer, hand saws, etc.) to obtain approximately 1-in. diameter pieces. At least one piece shall be obtained from each piece of debris. The pieces will be put into sample jars and sent to a contract laboratory for gamma spectroscopy, gross alpha, gross beta, Sr-89/90, PCBs, TCLP VOCs, TCLP SVOCs, and TCLP metals. The samples may be sized as appropriate at the laboratory to obtain sufficient material for analysis. Each sample will be from a unique media. For example, one sample will be a composite of sized pieces from wooden debris, while another sample will be a composite from metal debris.

4.3.2.2 Confirmation Sampling. Following excavation at TSF-26 (based upon characterization results), confirmation screening/sampling will be conducted to verify that all contamination exceeding the 23.3 pCi/g FRG for Cs-137 has been removed. The bottom of each excavated area will be scanned with a NaI portable scintillometer to more accurately identify the areas with the highest number of counts per second above background to define the locations of the confirmation samples. Confirmation samples will be collected from each excavated area to ensure that contaminated soil was removed. These samples will be biased toward areas where the NaI portable scintillometer identifies the highest counts above background, if any. All samples will be submitted to the INEEL RML for a 20-minute gamma spectrometric analysis to ensure the FRG has been achieved. If results from confirmation sampling indicate soil concentrations that exceed the 23.3 pCi/g Cs-137 FRG, additional excavation and subsequent confirmation resampling will be necessary.

4.3.3 Sampling Summary

Table 4-2 provides a summary of the planned sample collection design as described in the preceding sections. Figures 4-1 through 4-6 provide graphical depictions of the sample locations for those areas that have established sample locations (not based upon the results of field screening).

Table 4-2. Overview of pre-remediation sample analysis for Operational Unit 1-10 TSF-06, Area B and TSF-26 sites.

	OU 1-10 Remedial Action Sampling for TSF-06 and TSF-26 Sites Analyte Matrix and Sample Numbers (Does not include QA/QC samples)											
Analytes	TSF-06 Native Soil	TSF-06[a] Ditch	TSF-06/ TSF-26 PM-2A Feed Lines	TSF-06 Northern Shoulder Snake Ave	TSF-06 Road Bed	TSF-06 Asphalt	TSF-26 Native Soil	TSF-26 Ditch	TSF-26 Southern Shoulder Snake Ave.	TSF-26 PM-2A Tank Soil/ Bedding Material[b]	TSF-26 PM-2A Tank Soil near Tanks[b]	TSF-26 Debris
Total Metals (TAL)	10	8	12	2	5		10	4	2	6	12	---[c]
TCLP Metals	---	---	---	---	---	---	---	---	---	---	---	8
Total VOCs (CLP)	10	8	12	2	5	---	10	4	2	6	12	---
TCLP VOCs	---	---	---	---	---	---	---	---	---	---	---	8
Total SVOCs (CLP)	10	8	12	2	5	---	10	4	2	6	12	---
TCLP SVOCs	---	---	---	---	---	---	---	---	---	---	---	8
PCBs	10	8	12	2	5	5	10	4	2	6	12	8
Gamma Spectroscopy	60	24	12	10	20	10	75	18	10	20	40	8
Gross alpha, gross beta, Sr-89/90	10	8	12	2	5	5	10	4	2	6	12	8

a. Sampling will continue at horizontal step-out locations if needed, which may increase the number of samples analyzed using HPGe in situ gamma spectroscopy.

b. The quantity of samples is estimated; samples will be collected at 2-ft intervals from 4 ft below existing grade to refusal.

c. "---" indicates that no analysis would be run for that analyte at that location.

CLP = Contract Laboratory Program
SVOC = semi-volatile organic compound
TSF = Technical Support Facility
PCB = polychlorinated biphenyl
TAL = target analyte list
VOC = volatile organic compound
QA/QC = quality assurance/quality control
TCLP = toxicity characteristic leaching procedure

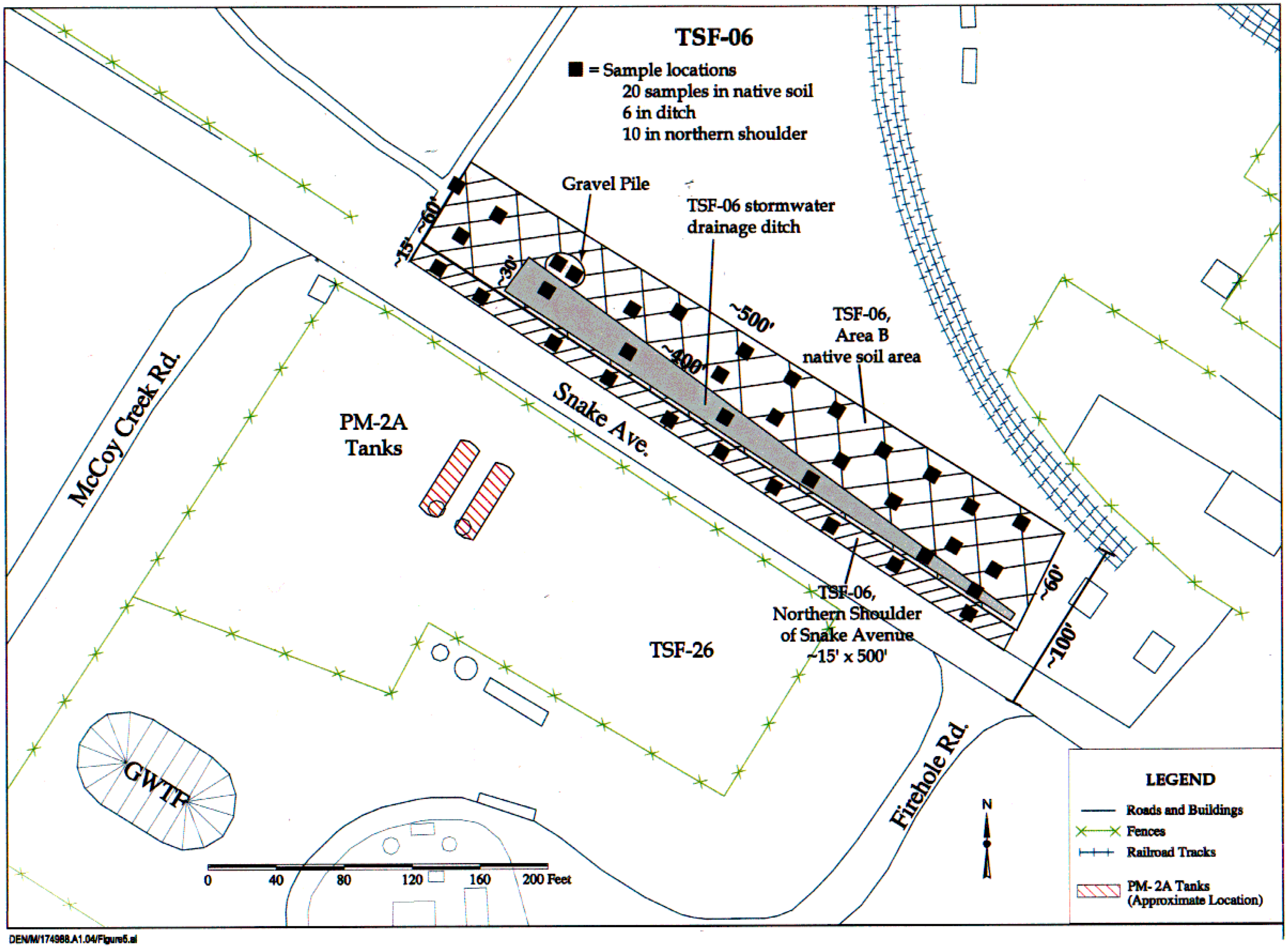


Figure 4-1. Sample locations for TSF-06, Area B native soil, storm water drainage ditch and northern shoulder of Snake Avenue.

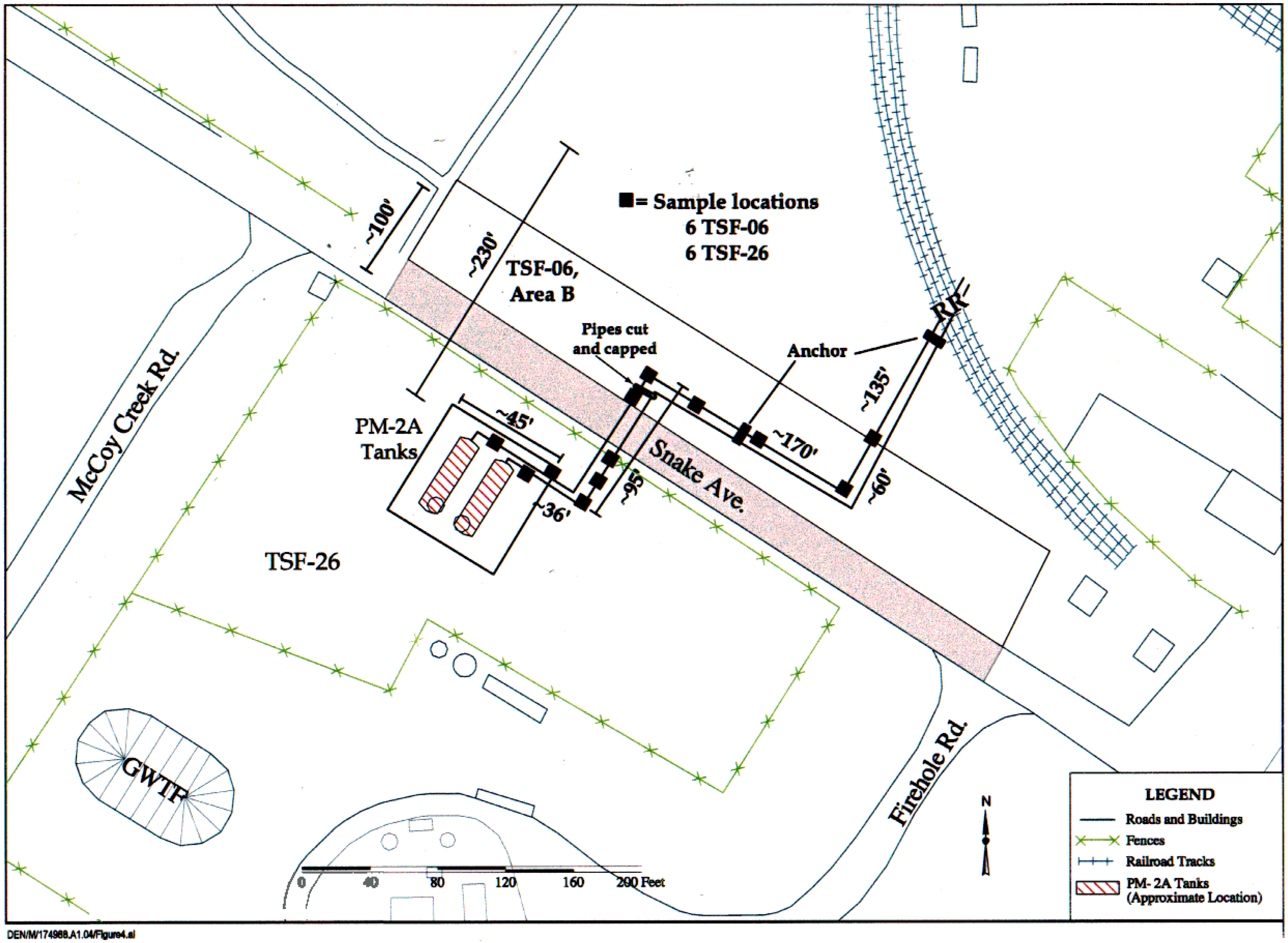
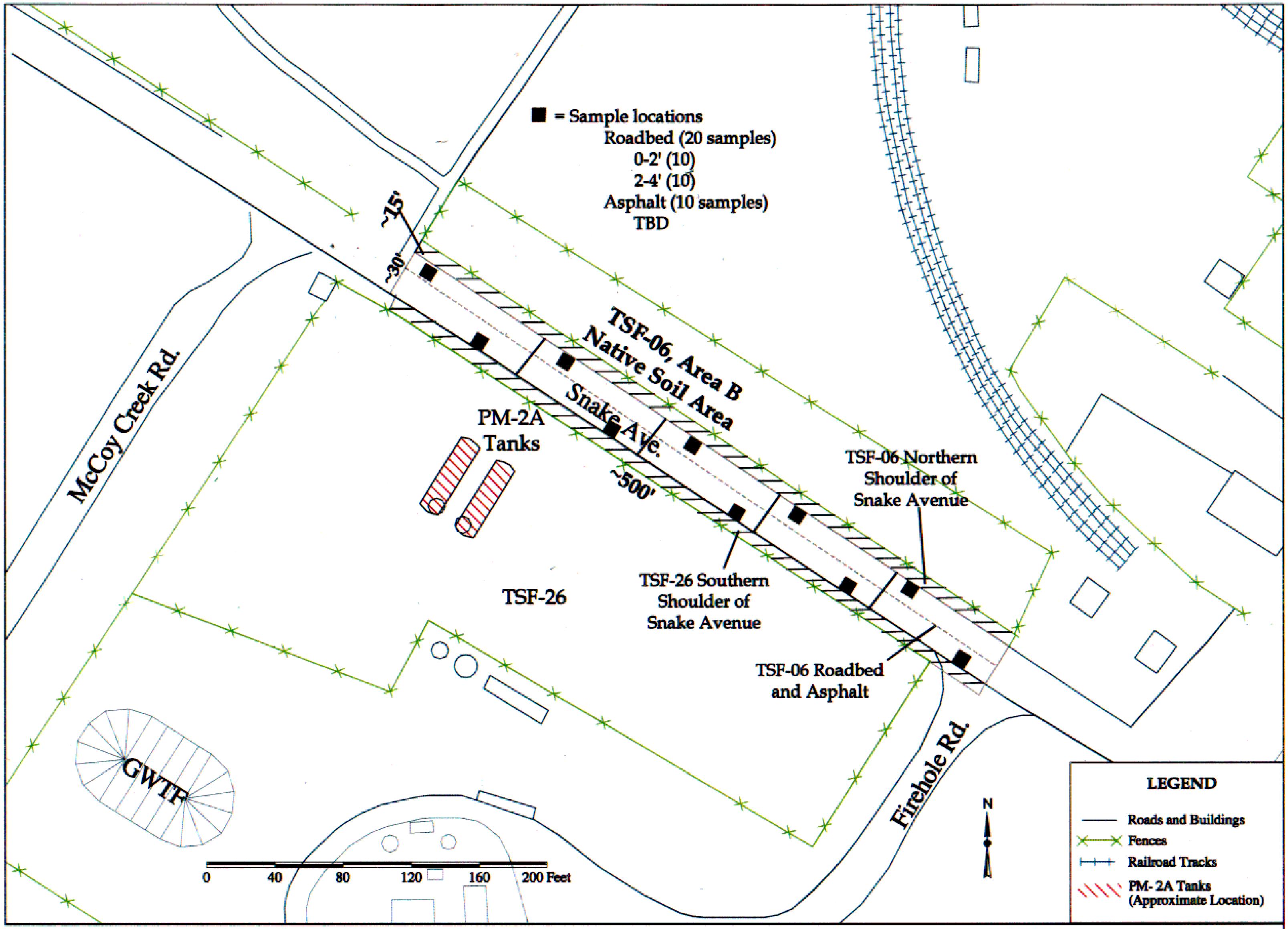


Figure 4-2. Sample locations for TSF-06, Area B and TSF-26 PM-2A feed lines.



DEN/M/174988.A1.04/Figure2.ai

Figure 4-3. TSF-06 Snake Avenue roadbed and asphalt sample locations.

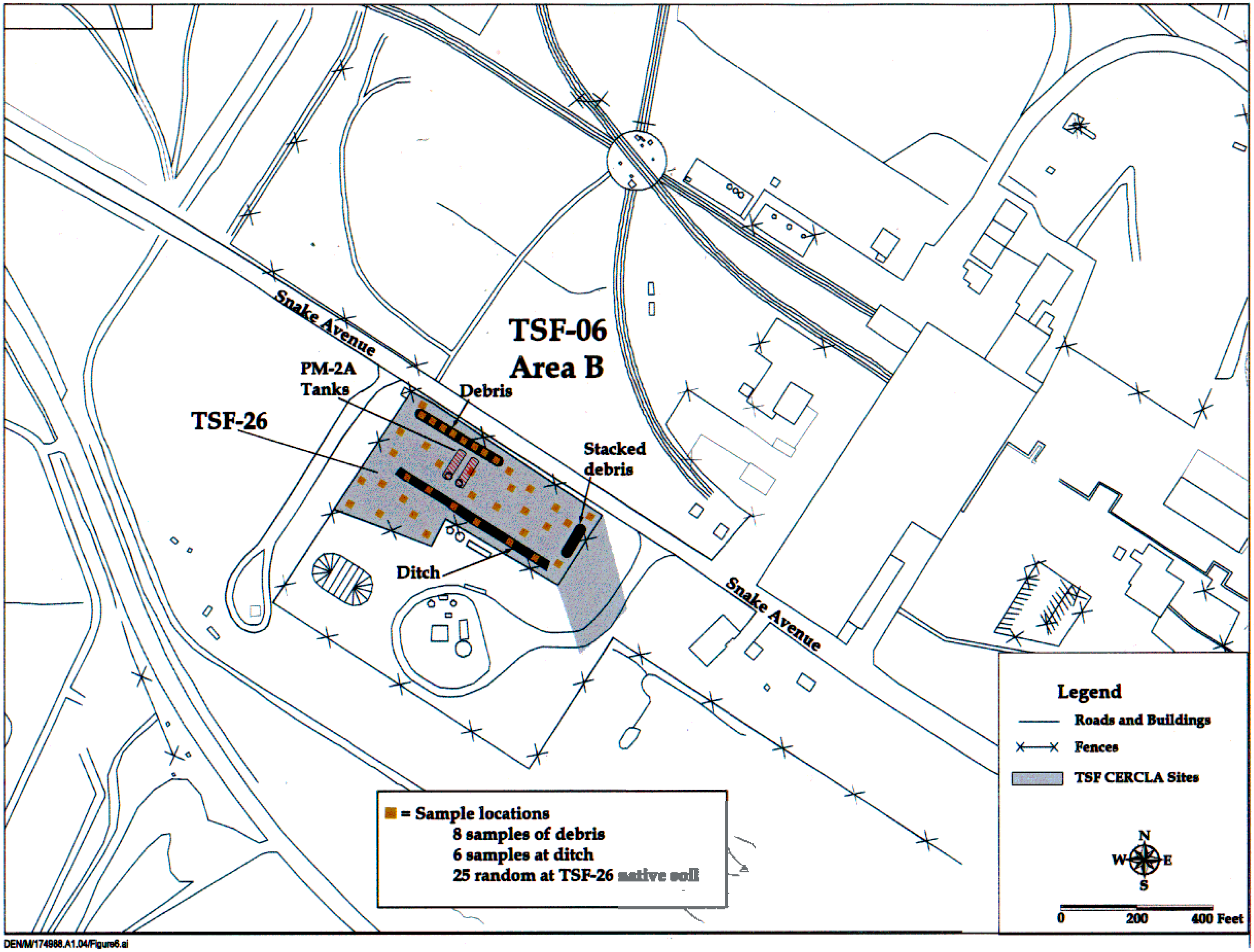


Figure 4-4. Sample locations for TSF-26 native soil, drainage ditch, and miscellaneous debris.

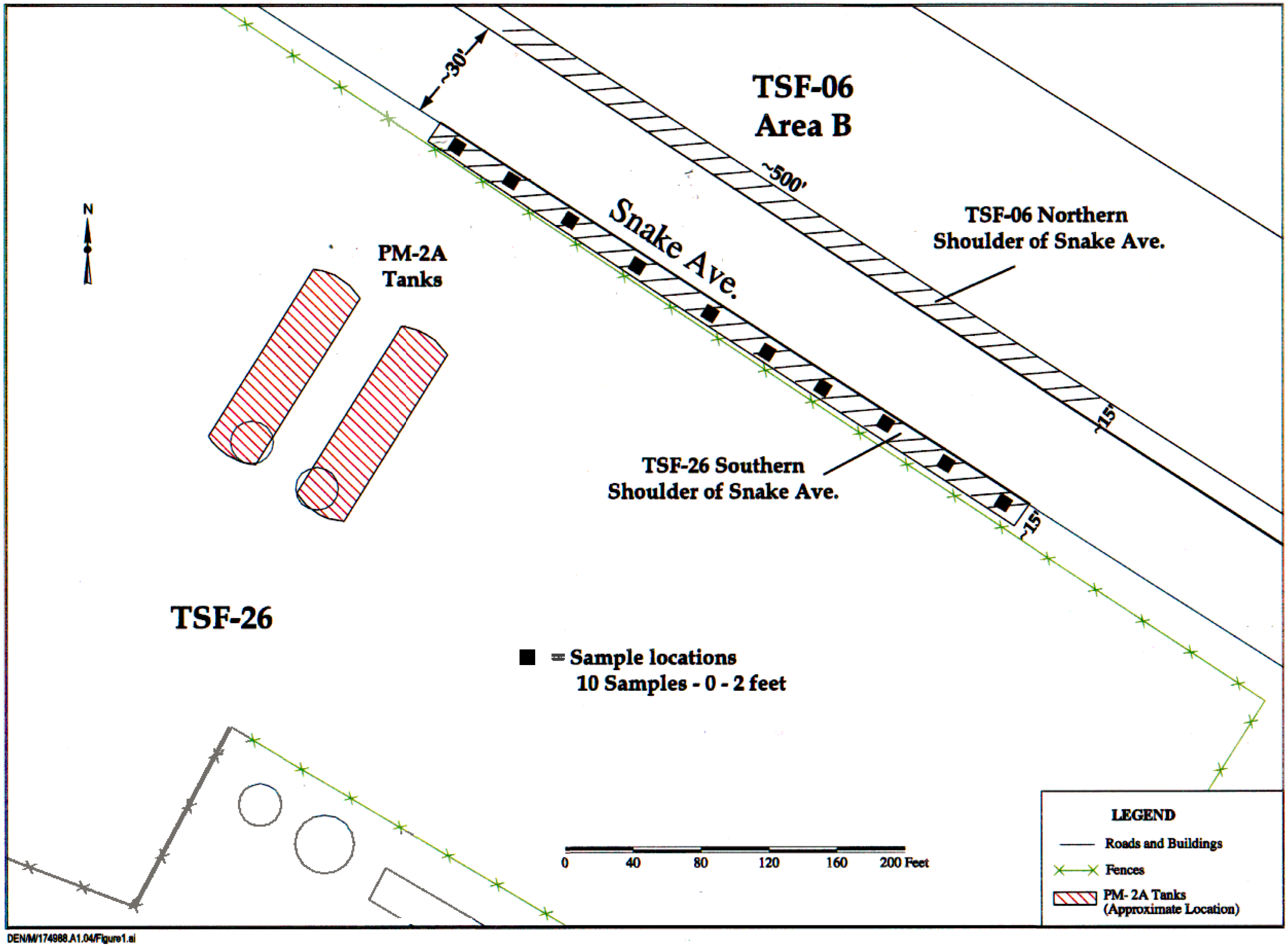


Figure 4-5. Sample locations for TSF-26 southern shoulder of Snake Avenue.

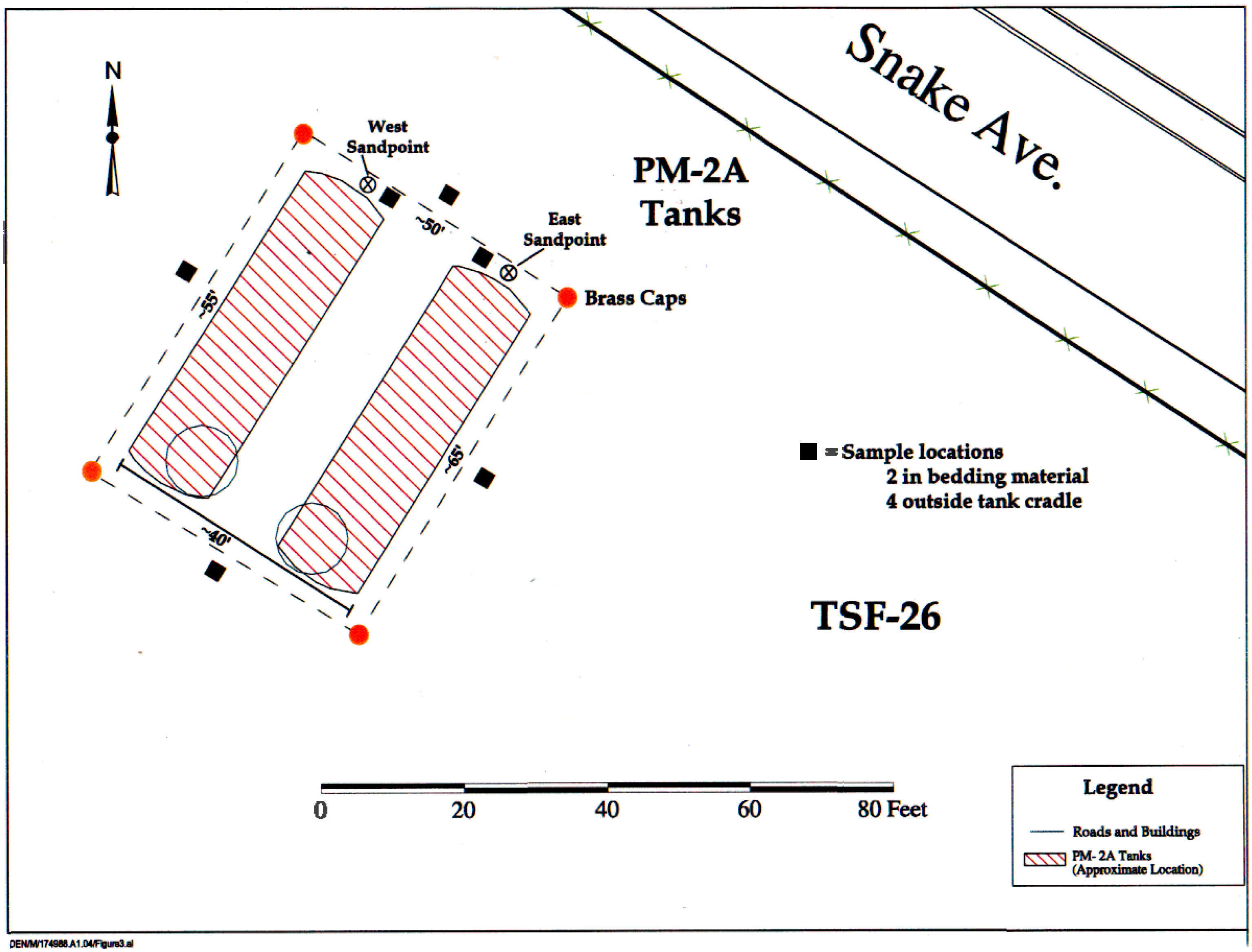


Figure 4-6. Sample locations for TSF-26 PM-2A Tanks.

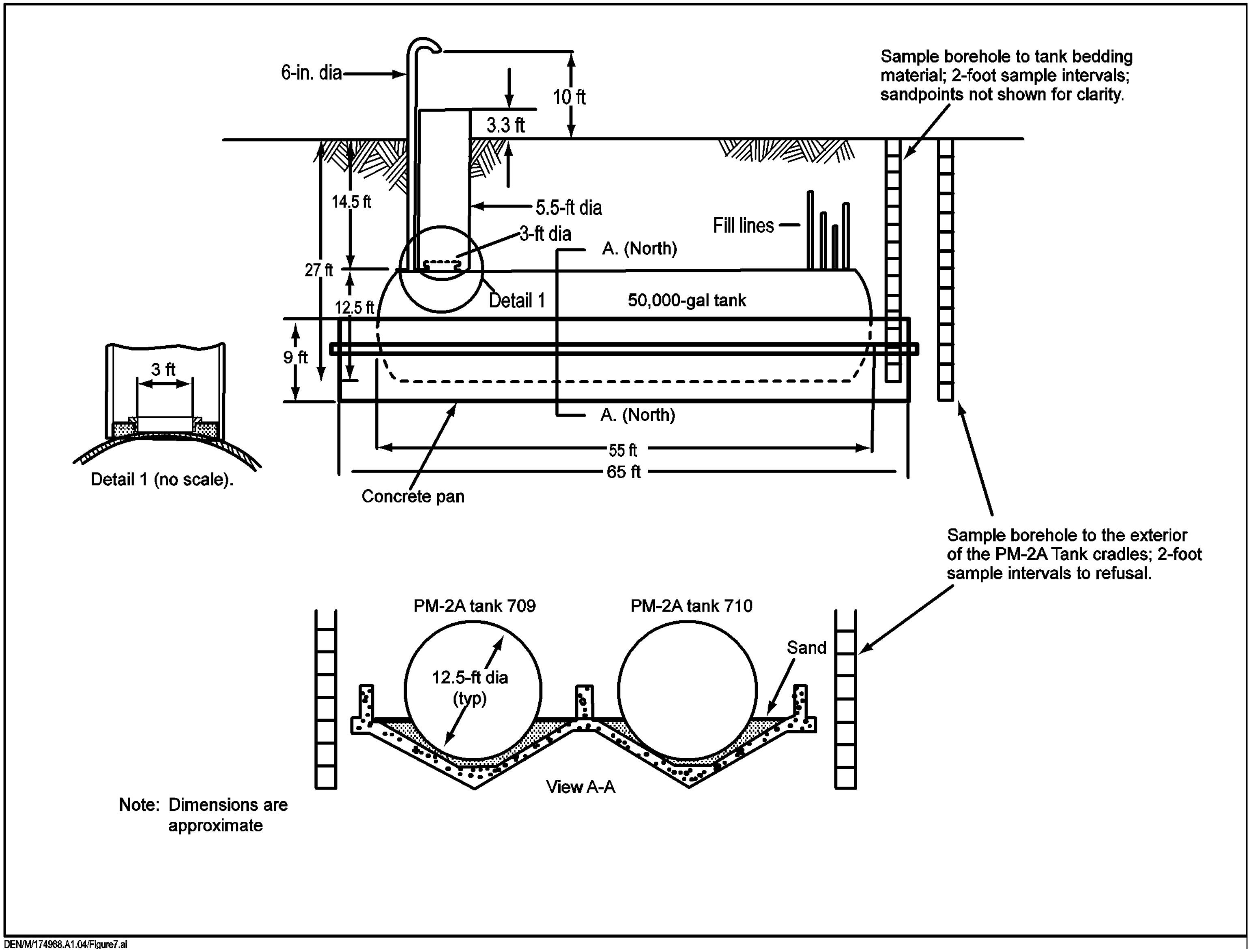


Figure 4-7. Cross-section of the PM-2A Tanks and planned sample locations.

5. SAMPLING DESIGNATION

Samples will be identified with a unique code and arranged in a sampling and analysis plan (SAP) table and database.

5.1 Sample Identification Code

A systematic character identification (ID) code will be used to uniquely identify all samples. Uniqueness is required to maintain consistency and prevent the same ID code from being assigned to more than one sample.

The first designator of the code, 1, refers to the sample originating from WAG 1. The second and third designators, RA, refer to the sample being collected in support of the remedial action. The next three numbers designate the sequential sample number for the project. Regular and field duplicate samples will be designated with a two-character set (e.g., 01, 02). The last two characters refer to a particular analysis and bottle type. The SAP tables, presented in Appendix A, provide sample numbers as examples; the official sample numbers will be assigned by the SMO.

For example, a soil sample collected in support of the remedial action might be designated as 1RA00101R4, where (from left to right):

- **1** designates the sample as originating from WAG 1
- **RA** designates the sample as being collected for the remedial action
- **001** designates the sequential sample number
- **01** designates the type of sample (01 = regular, 02 = field duplicate)
- **R4** designates gamma spectrometric analysis.

The IEDMS database will be used to record all pertinent information associated with each sample identification code. Preparation of the plan database and completion of the SMO request for services are used to initiate the sample and sample waste tracking activities performed by the SMO.

5.2 Sampling and Analysis Plan Table/Database

5.2.1 General

A SAP table format was developed to simplify the presentation of the sampling scheme for project personnel. The following subsections describe the information recorded in the SAP tables, which are presented in Appendix A.

5.2.2 Sample Description Fields

The sample description fields contain information relating to individual sample characteristics.

5.2.2.1 Sampling Activity. The sampling activity field contains the first six characters of the assigned sample number. The sample number in its entirety will be used to link information from other sources (field data, analytical data, etc.) to the information in the SAP tables for data reporting, sample tracking, and completeness reporting. The analytical laboratory will also use the sample number to track and report analytical results.

5.2.2.2 *Sample Type.* Data in this field will be selected from the following:

REG	for a regular sample
QC	for a QC sample.

5.2.2.3 *Matrix.* Data in this field will be selected from the following:

Soil	for soil samples
Water	for QA/QC samples.

5.2.2.4 *Collection Type.* Data in this field will be selected from the following:

GRAB	for grab
COMP	for composite
FBLK	for field blanks
RNST	for rinsates
DUP	for duplicate samples.

5.2.2.5 *Planned Date.* This date is related to the planned sample collection start date.

5.2.3 Sample Location Fields

This group of fields pinpoints the exact location for the sample in three-dimensional space, starting with the general AREA, narrowing the focus to an exact location geographically, and then specifying the DEPTH in the depth field.

5.2.3.1 *Area.* The AREA field identifies the general sample collection area. The field should contain the standard identifier from the INEEL area being sampled. For this investigation, samples are being collected from TAN.

5.2.3.2 *Location.* This field LOCATION may contain geographical coordinates, x-y coordinates, building numbers, or other location identifying details, as well as program-specific information, such as a borehole or well number. Data in this field will normally be subordinated to the AREA. Samples will be collected from the Soil Contamination Area South of the Turntable (TSF-06, Area B) and the PM-2A Tanks (TSF-26). The LOCATION field identifier will correspond to these two individual sites.

5.2.3.3 *Type of Location.* The TYPE OF LOCATION field supplies descriptive information concerning the exact sample location. Information is this field may overlap that in the location field, but it is intended to add detail to the location (e.g., native soil, road bed, asphalt, tank cradle).

5.2.3.4 Depth. The DEPTH of a sample location is the distance in feet from surface level or a range in feet from the surface.

5.2.4 Analysis Type

5.2.4.1 Analysis type (AT) 1 through 20. The ANALYSIS TYPE (AT) fields indicate analytical types (radiological, chemical, hydrological, etc.). Space necessary to clearly identify each type is provided at the bottom of the form. A standard abbreviation should also be provided, if possible.

6. SAMPLING PROCEDURES

The following sections describe the sampling procedures to be used for the planned sampling and analyses described in this FSP. Prior to the commencement of any sampling activities, a daily presampling meeting will be held to review the requirements of the FSP and Health and Safety Plan (HASP), discuss responsibility of team members and safety issues, and ensure supporting documentation has been completed.

6.1 Sampling Requirements

The sampling procedures indicated below will guide the collection of representative samples that will achieve the data quality objectives for the WAG 1, OU 1-10, RD/RA Group 1 investigation for the TSF-06 and TSF-26 sites. Procedures for sampling are provided as guidelines for the field sampling team and sample collection activities. The list of equipment for the field activities is given in Section 7.2.

Sampling activities include field screening for radiological contaminants and precharacterization sampling and confirmation sampling for waste profile analysis. The following subsections describe the screening and sampling methodology that will be performed by the sampling team.

6.1.1 Field Screening

Field screening using HPGe detectors will be used during the sampling event for real-time characterization onsite to minimize sampling costs and provide faster results. Samples collected for waste profiling, RCRA closure data needs, and confirmation sampling will be sent for laboratory analysis, but may also utilize field HPGe detectors. A portable gamma scintillometer, using a NaI crystal mounted on the end of a medial crutch, will be used to scan for the presence of Cs-137. The gamma survey will be conducted by sweeping the NaI end of the crutch approximately 0.6 or 0.9 m (2 or 3 ft) on either side of the direction of travel while maintaining the detector a few inches above ground level. The travel speed of the operator will be limited to no more than 0.22 m/sec (0.73 ft/sec). Operation of the NaI instrument will follow the procedures outlined in the *Scout/Scoutmaster User's Guide* (Quantrad Sensor 1997).

Field screening for gamma radiation will also be performed prior to the initiation of sampling activities each day. Background radiation ranges will be obtained by measuring the naturally occurring radiation of uncontaminated soils in areas upwind of the sampling areas. The use of radiological screening instrumentation will be as determined by the health and safety officer (HSO) and the radiological control technician (RCT). The RCT will calibrate these instruments in accordance with the appropriate procedures. Radiological contaminants will be identified when screening indicates a reading of 100 cpm above background radiation levels.

Sample collection will be performed wherever radiological screening identifies high areas of contamination above background levels. If action levels for health and safety concerns are sustained in the breathing zones, field personnel will be required to wear appropriate personal protective equipment (PPE) as determined by health and safety personnel.

6.1.2 Soil Sampling

Sampling procedures will be discussed each day in a presampling meeting. The meeting discussion will include, but is not limited to, sample activities for the day, responsibilities of team members, and safety issues.

Soil samples from TSF-06, Area B and TSF-26 (as shown in the SAP tables in Appendix A) will be collected in accordance with program requirements directive (PRD) -5030/MCP-3480/MCP-3653, "Sampling and Analysis Process for CERCLA and D&D&D Activities."

Before soil sample collection begins, an equipment rinsate will be collected from the sampling equipment that collected the particular sample (e.g., hand auger, core barrel, stainless steel spoon). The field team members will use the field guidance forms (discussed in Section 7.1.2) from the SMO to ensure the proper jars and preservatives are used for each analysis type. The anticipated equipment needs are listed in Section 7.2, "Sample Equipment and Handling."

Prior to being sampled, each sample location will be marked with a wooden stake. Samples will be collected to the depths identified in the SAP tables. The samples will be collected using appropriate soil retrieval equipment and placed immediately in the sample jars.

Low-level radionuclide-contaminated soil is expected to be encountered in TSF-06, Area B and TSF-26. All samples obtained from these areas will be surveyed for external contamination by the project RCT, using appropriate equipment, and the result will be documented on the sample label and the chain-of-custody form (discussed in Section 7.2.4). Requirements for release of materials from TSF-06, Area B and TSF-26 will be documented in the project radiological work permit. Requirements for waste disposition are discussed in Section 6.2.

Sampling equipment will be decontaminated between sample locations in accordance with PRD-5030/MCP-3480/MCP-3653, "Sampling and Analysis Process for CERCLA and D&D&D Activities." After soil sample collection is complete, an equipment rinsate will be collected. In addition, following sample collection, precise sample locations will be staked to allow for surveying.

Tables 3.1 and 3.2 in the QAPjP (DOE-ID 2002a) include identification of the container volumes, types, holding times, and preservative requirements that apply to all soil and liquid samples being collected under this FSP. Following collection, the date and time of collection, as well as the sampler's initials, will be recorded on the sample label with a waterproof black marker. The samples will be placed in coolers with blue ice (if required) while awaiting preparation and shipment to the appropriate laboratory. Samples will be prepared and packaged in accordance with technical procedure (TPR) -4913, "Chain of Custody and Sample Labeling for ER and D&D&D Projects."

6.1.3 Personal Protective Equipment

The personal protective equipment (PPE) required for this sampling effort is discussed in the project HASP, and may include, but is not limited to, gloves, respirator cartridges, shoe covers, and coveralls.

Prior to being disposed, all PPE will be characterized based on soil sample and field screening results, and a hazardous waste determination will be made as per the requirements set forth in 40 *Code of Federal Regulations* (CFR) 262.11.

6.1.4 Sampling Location Surveys

Prior to being sampled, all sample location points will be located, staked, and clearly marked with the appropriate designations. Staked sampling location will be surveyed in accordance with the requirements set forth in PRD-5030/MCP-3480/MCP-3653, "Sampling and Analysis Process for CERCLA and D&D&D Activities," to establish horizontal (northing and easting coordinates) and vertical (elevation referenced to mean sea level) control. Permanent benchmarks will be used to reference the vertical control data and the horizontal grid coordinates.

Horizontal (H) and vertical (V) control will be consistent with standard third order accuracy, where:

H = 1/5,000 or 5 seconds of arc

V = 0.05 feet per M (length of loop in miles).

6.1.5 Shipping Screening

Prior to releasing samples collected from radiologically contaminated areas from the site, the RCT will field screen all such samples for external contamination to determine whether they meet the release criteria for unrestricted use. Samples that do not meet these criteria may be submitted to the RML at the Test Reactor Area for a 20-minute gamma spectrometric analysis to determine the concentration of radionuclides present and the hazardous material classification for shipping purposes. Shipping screening could be onsite using HPGe, if acceptable to the hazardous materials shipper and current INEEL policy. This determination will be made by the RCT. All samples will be shipped to the laboratories by a company-certified hazardous materials shipper in accordance with Department of Transportation (DOT) regulations and current INEEL policy.

6.1.6 Field Decontamination

Field decontamination procedures are designed to prevent cross-contamination between locations and samples and to prevent off-Site contaminant migration. All equipment associated with sampling will be thoroughly decontaminated prior to daily activities and between sample locations in accordance with PRD-5030/MCP-3480/MCP-3653, "Sampling and Analysis Process for CERCLA and D&D&D Activities." Following decontamination, sampling equipment will be wrapped in foil to prevent contamination from windblown dust.

6.2 Handling and Disposition of Remediation Waste

All waste streams that are generated as a result of the sampling activities will be containerized and maintained at TAN until activities have been completed. All wastes generated as part of TSF-06 and TSF-26 sampling will be managed as F001-listed waste. At the conclusion of sampling operations, sanitary wastes will be disposed at the INEEL landfill under the protocols identified in the INEEL *Reusable Property, Recyclable Materials, and Waste Acceptance Criteria* (RRWAC) (DOE-ID 2001). Contaminated PPE, wipes, and other material will be managed as secondary waste. These wastes will be managed as CERCLA remediation-derived waste and will be stored in accordance with MCP-3475, "Temporary Storage of CERCLA-Generated Waste at the INEEL." Waste will be handled, packaged, stored and managed according to Waste Generator Services (WGS) procedures and Treatment, Storage, and Disposal Facility WAC. The WGS interface will assist in packaging and transporting the waste and will aid in ensuring compliance with applicable waste storage, characterization, treatment, and disposal regulations.

Waste streams generated as a result of the sampling may include (but not be limited to) PPE, sample supplies and equipment, decontamination water (which may be used in small quantities during sampling), and excess or spent samples. Sample supplies, equipment, and PPE will be placed in drums or other appropriate containers and stored until ultimate disposition. If decontamination water, which may include deionized water, soap, and small quantities of isopropanol, is generated, it will be managed with the final waste at the work site. The volume of decontamination fluids produced will be minimized by using spray bottles or wipes to apply the fluids.

Samples will be handled in accordance with TPR-4908, "Handling and Shipping Samples for ER and D&D&D Projects." Analytical results from the previous historical data will be used to perform a hazardous waste determination in accordance with 40 CFR 262.11.

6.2.1 Solid Sanitary Wastes

Solid sanitary waste includes all paper, packaging, absorbent towels, and other miscellaneous waste generated during sample preparation. However, no waste generated in a radiologically-controlled area will be placed with nonradiological (cold) waste without first being surveyed by a RCT and released as clean. Packaging that does not come in contact with the sample material may be considered sanitary waste because it does not contain a radioactive or hazardous component. The small quantity of this type of waste will be placed in clear 208-L (55-gal) trash bags.

When full, each bag will be taped shut, marked with the generating work site name and a generator contact name and phone number, and documented in the FTL's logbook. The bags will be surveyed by a RCT prior to being placed in a facility cold waste dumpster with other waste destined for disposal at the Central Facilities Area Landfill complex. The dates of disposal and quantities of cold waste disposed will be noted in the FTL or project logbook. Used "conditional waste" materials (i.e., yellow Tyveks, yellow poly materials, and PPE gloves that include the radiation symbol) found to be free of radiological contamination will be handled and disposed in accordance with the RRWAC (DOE-ID 2001).

6.2.2 Other Waste

Other waste may consist of PPE, sampling debris, and other secondary waste. The PPE that is stained will be managed as mixed low-level radioactive, F001-listed waste. During sampling activities, personnel will be required to wear PPE, as outlined in the project HASP. After exiting a radiologically controlled zone and doffing PPE, personnel will place the PPE in clear plastic bags. Sampling debris may include, but are not limited to, absorbent wipes, smears, and plastic sheeting and sleeving used for contamination control. Each bag of waste will be radiologically surveyed by an RCT and marked with an identifying number and the survey results. The taped bags will be containerized for disposal with other similar waste streams. Each container will be marked with the following information:

- Radiation level at contact (milliroentgen-equivalent-man-per-hour [mrem/hr])
- Gross weight (lb)
- Generating facility identification
- Date of generation.

Prior to shipment to the disposal site, each container will be sealed in accordance with the requirements of the RRWAC (DOE-ID 2001) or the appropriate disposal facility's waste acceptance criteria (e.g., the ICDF Landfill WAC). Containers used to store and/or transport hazardous waste must meet the requirements as specified in 40 CFR 264, Subpart 1. The RRWAC document (DOE-ID 2001) contains details concerning packaging and container condition requirements that must be followed. Waste Generator Services will be consulted to ensure the packaging is acceptable to the receiving facility.

6.2.3 Waste Minimization

Waste minimization for the project will be primarily achieved through design and planning to ensure efficient operations that minimize unnecessary waste generation. As part of the prejob briefing, an emphasis will be placed on waste reduction philosophies and techniques, and personnel will be encouraged to continuously attempt to improve methods. No one will use, consume, spend, or expend equipment or materials thoughtlessly or carelessly. Practices to be instituted to support waste minimization include, but are not limited to, the following:

- Restricting material (especially hazardous material) entering radiological buffer areas to those needed for performance of work

- Substituting recyclable items for disposable items

- Reusing items when practical

- Segregating contaminated from uncontaminated waste

- Segregating reusable items such as PPE and tools.

7. DOCUMENTATION MANAGEMENT AND SAMPLE CONTROL

Section 7.1 summarizes document management and sample control. Documentation includes field logbooks used to record field data and sampling procedures, photographic documentation, chain-of-custody forms, and sample container labels. Section 7.2 outlines the sample handling and discusses chain-of-custody, radioactivity screening, and sample packaging for shipment to the analytical laboratories.

7.1 Documentation

The FTL will be responsible for controlling and maintaining all field documents and records, and for ensuring that all required documents will be submitted to the ER Administrative Records and Document Control Office at the conclusion of the project.

Sample documentation, shipping, and custody procedures for this project are based on EPA-recommended procedures that emphasize careful documentation of sample collection and sample transfer. The appropriate information pertaining to each sample will be recorded in accordance with TPR-4910, "Logbook Practices for ER and D&D&D Projects," TPR-4913, "Chain-of Custody and Sample Labeling for ER and D&D&D Projects," and the QAPjP (DOE-ID 2002a). All personnel involved with handling, managing, or disposing of samples will be familiar with TPR-4908, "Handling and Shipping Samples for ER and D&D&D Projects," and all samples will be dispositioned accordingly.

A document action request (DAR) is required when field conditions dictate making any changes to this FSP, the project HASP, or other controlled project procedures (e.g., requiring additional analyses to meet appropriate WAC). If necessary, a DAR will be executed in accordance with MCP-233, "Process for Developing, Releasing, and Distributing ER Documents."

All information recorded on project field documentation (e.g., logbooks, chain-of-custody forms) will be made in permanent ink. All field documentation errors will be corrected by drawing a single line through the error and entering the correct information; all corrections will be initialed and dated. In addition, photographs will be taken to document the field sampling activities.

7.1.1 Sample Container Labels

Waterproof, gummed labels generated from the IEDMS database will display information such as the sample ID number, the name of the project, sample location, depth, and requested analysis type. In the field, label information will be completed and placed on the containers before samples are collected. Information concerning sample date, time, preservative used, field measurements of hazards, and the sampler's initials will be recorded during field sampling.

7.1.2 Field Guidance Forms

Field guidance forms, provided for each sample location, will be generated from the IEDMS database to ensure unique sample numbers. Used to facilitate sample container documentation and organization of field activities, these forms contain information regarding the following:

- Media

- Sample identification numbers

- Sample location

- Aliquot identification
- Analysis type
- Container size and type
- Sample preservation methods
- Field logbooks.

In accordance with the Administrative Records and Document Control format, field logbooks will be used to record information necessary to interpret the analytical data. All field logbooks will be controlled and managed according to TPR-4910, "Logbook Practices for ER and D&D&D." The FTL, or designee, will ensure by periodic inspection that the field logbooks are being maintained in accordance with this MCP. The field logbooks will be submitted to the project files at the completion of field activities.

7.1.2.1 Sample Logbooks. Sample logbooks used by the field teams will contain such information as the following:

- Physical measurements (if applicable)
- All QA/QC samples
- Shipping information (e.g., collection dates, shipping dates, cooler ID number, destination, chain-of-custody number, name of shipper).

7.1.2.2 Field Team Leader's Daily Logbook. A project logbook maintained by the FTL will contain a daily summary of the following:

- All team activities
- Weather conditions
- Problems encountered
- Visitors
- List of work site contacts.

This logbook will be signed and dated by the FTL, or designee, at the end of each day's sampling activities.

7.2 Sample Equipment and Handling

Analytical samples for laboratory analyses will be collected in precleaned bottles and packaged according to American Society for Testing and Materials or EPA-recommended procedures. The QA/QC samples will be included to satisfy the QA/QC requirements for the field operation as outlined in the QAPjP (DOE-ID 2002a). Qualified (SMO-approved) analytical and testing laboratories will analyze these samples.

7.2.1 Sample Equipment

Included below is a tentative list of necessary equipment and supplies. This list is as extensive as possible, but not exhaustive, and should only be used as a guide. Other equipment and supplies specified in the project-specific HASP are not included in this section. Sampling equipment that would come into contact with sample material will be cleaned prior to use, using an appropriate method (e.g., Alconox or similar nonphosphate soap with deionized water rinse, or equivalent). Field sampling and decontamination supplies may include the following:

- Drill rig capable of standard wire line coring
- Stainless-steel hand augers
- Power auger
- Tape measure (30.5 m [100 ft])
- Wood stakes and ribbon (30.5 m [100 ft])
- Stainless steel spoons
- Stainless steel or aluminum composting pans
- Paper wipes
- Plastic garbage bags
- Deionized water (20 L [5.3 gal] minimum)
- Nonphosphate-based soap
- Isopropanol
- Spray bottles
- Aluminum foil
- Pipe wrench
- Crescent wrench
- Hammer
- Tables
- Certified ultra pure water (5 L [1.3 gal] JT Baker)
- Sample and shipping logbook
- FTL logbook

- Controlled copies of the FSP, QAPjP, HASP, and applicable referenced procedures
- Black ink pens
- Black ultra-fine markers
- Sample containers, as specified in the QAPjP
- Preprinted sample labels and field guidance forms
- Nitrile or latex gloves
- Leather work gloves
- Ziploc plastic bags
- Custody seals.

Sample preparation and shipping supplies include the following:

- Pipettes
- pH paper
- Nitrile or latex gloves
- Paper wipes
- Parafilm
- Clear tape
- Strapping tape
- Resealable plastic bags (such as Ziploc) in various sizes
- Chain-of-custody forms
- Shipping request forms
- Names, addresses, telephone numbers, and contact names for analytical laboratories
- Task order statements of work (TOSs) for analytical laboratories and associated purchase order numbers
- Vermiculite or bubble-wrap (packaging material)
- Plastic garbage bags
- Blue Ice

- Coolers
- "This Side Up" and "Fragile" labels
- Address labels
- Sample bottles and lids
- Custody seals.

7.2.2 Sample Containers

Tables 3.1 and 3.2 in the QAPjP (DOE-ID 2002a) identify container volumes, types, holding times, and preservative requirements that apply to all soil and liquid samples being collected under this FSP. All containers will be precleaned (typically certified by the manufacturer) using the appropriate EPA-recommended cleaning protocols for the bottle type and sample analyses. Extra containers will be available in case of breakage, contamination, or if the need for additional samples arises. Prior to use, preprinted labels with the name of the project, sample identification number, location, depth, and requested analysis will be affixed to the sample containers.

7.2.3 Sample Preservation

Water samples will be preserved in a manner consistent with the QAPjP (DOE-ID 2002a). If cooling is required for preservation, the temperature will be checked periodically prior to shipment to certify adequate preservation for those samples that require temperatures of 4° C (39° F) for preservation. Ice chests (coolers) containing frozen, reusable ice will be used to chill samples in the field after sample collection, if required.

7.2.4 Chain-of-Custody

The chain-of-custody procedures will be followed per TPR-4913, "Chain-of-Custody and Sample Labeling for ER and D&D&D Projects," and the QAPjP (DOE-ID 2002a). Sample bottles will be stored in a secured area accessible only to the field team members.

7.2.5 Transportation of Samples

Samples will be shipped in accordance with the regulations issued by DOT (49 CFR Parts 171 through 178) and EPA sample handling, packaging, and shipping methods (40 CFR 262). All samples will be packaged in accordance with the requirements set forth in TPR-4913, "Chain-of-Custody and Sample Labeling for ER and D&D&D Projects."

7.2.5.1 Custody Seals. Custody seals will be placed on all shipping containers to ensure that tampering or unauthorized opening will not compromise sample integrity. The seal will be attached in such a way that opening the container requires the seal to be broken. Clear plastic tape will be placed over the seals to ensure that the seals are not damaged during shipment. Seals will be affixed to containers before the samples leave the custody of the sampling personnel.

7.2.5.2 Onsite and Off-Site Shipping. An onsite shipment is any transfer of material within the perimeter of the INEEL. Site-specific requirements for transporting samples within Site boundaries and those required by the shipping/receiving department will be followed. Shipment within the INEEL boundaries will conform to DOT requirements as stated in 49 CFR 171 through 178. Off-Site sample shipments will be coordinated with INEEL Packaging and Transportation personnel, as necessary, and will conform to all applicable DOT requirements.

7.3 Documentation Revision Requests

Revisions to this document will follow MCP-233, "Process for Developing, Releasing, and Distributing ER Documents."

8. PROJECT ORGANIZATION AND RESPONSIBILITIES

The organizational structure illustrated in Figure 8-1 presents an overview of the general resources and expertise required to perform the work while minimizing risks to worker health and safety. The following sections outline responsibilities of key site personnel.

8.1 Key Personnel Responsibilities

Responsibilities for key personnel associated with the field activities described in this FSP are described in the following sections.

8.1.1 Environmental Restoration Director

The environmental restoration (ER) director has ultimate responsibility for the technical quality of all projects, the maintenance of a safe environment, and the safety and health of all personnel during field activities performed by or for the ER program. The ER director provides technical coordination and interfaces with DOE-ID. The ER director ensures the following:

- Project/program activities are conducted in accordance with the Occupational Safety and Health Administration (OSHA), DOE, EPA, and IDEQ requirements and agreements.
- Program budgets and schedules are approved and monitored to be within budgetary guidelines.
- Personnel, equipment, subcontractors, and services are available.
- Direction is provided for tasks development, findings evaluation, conclusions and recommendations development, and reports production.

8.1.2 Waste Area Group 1 Project Manager

The Waste Area Group (WAG) 1 project manager (PM) or designee (e.g., OU 1-10 RD/RA PM) will ensure that all project activities are in compliance with the following guidelines and regulations:

- INEEL MCPs and TPRs
- The QAPjP (DOE-ID 2002a), the project HASP, and this FSP
- All applicable OSHA, EPA, DOE, DOT, and State of Idaho requirements.

The PM is responsible for the overall work scope, schedule, and budget, including such tasks as the following:

- Developing resource-loaded, time-phased control account plans based on the project's technical requirements, budgets, schedules, and project tasks
- Coordinating all document preparation, field, laboratory, and modeling activities
- Implementing the project requirements and ensuring that work is performed as planned.

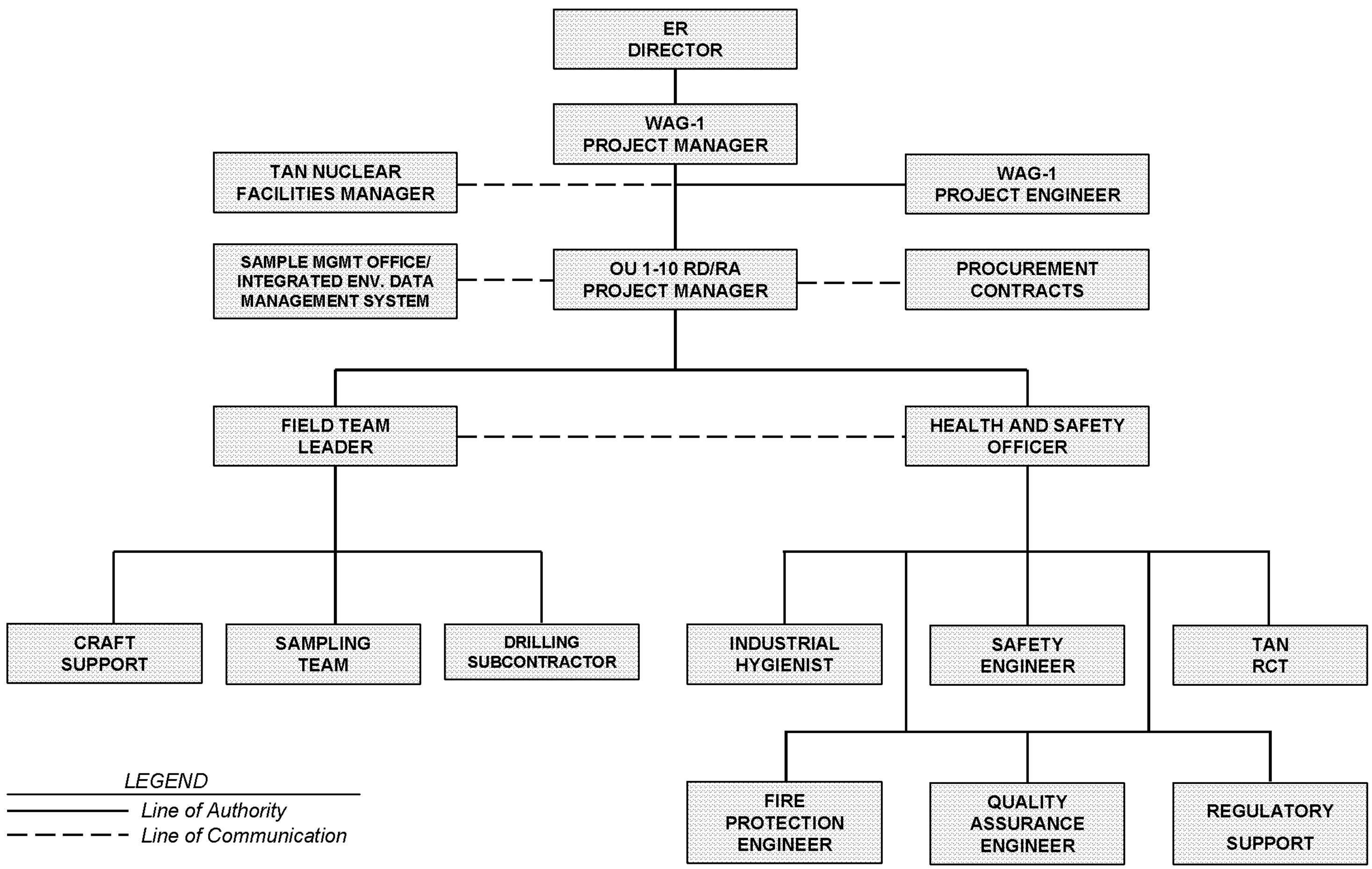


Figure 8-1. Organizational chart.

The PM will ensure that employee job function evaluations (INEEL Form 340.02) are completed for all project employees, reviewed by the project industrial hygienist (IH) for validation, and submitted to the Occupational Medical Program (OMP) for determination of necessary medical evaluations.

Other functions and responsibilities of the PM include:

- Developing the documentation required to support the project
- Ensuring the technical review and acceptance of all project documentation
- Developing the site-specific plans required by the ER program, such as work plans, environmental, safety, and health (ES&H) plans, and SAPs
- Ensuring that project activities and deliverables meet schedule and scope requirements, as described in the FFA/CO, Attachment A, "Action Plan for Implementation of the Federal Facility Agreement and Consent Order," (DOE-ID 1991) and applicable guidance
- Supporting the CERCLA and National Environmental Policy Act (NEPA) public review and comment processes by identifying their requirements and scheduling and organizing required review and comment activities
- Identifying the subproject technology needs
- Coordinating and interfacing with the units within the program support organization on issues relating to QA, ES&H, and NEPA support for the project
- Coordinating site-specific data collection, review for technical adequacy, and data input to an approved database
- Coordinating and interfacing with subcontractors to ensure milestones are met, adequate management support is in place, technical scope is planned and executed appropriately, and project costs are kept within budget.

8.1.3 Waste Area Group 1 Project Engineer

The Waste Area Group (WAG) 1 project engineer (PE) is responsible for the execution of the project's technical work. This includes, but is not limited to:

- Supervising engineers to ensure that timely, cost-effective engineering and design services are performed in accordance with project orders and directives, using sound engineering practices and high technical standards
- Providing technical resource and schedule integration, establishing priorities, and identifying and requesting the resources necessary to accomplish work objectives for all assigned engineering and design activities
- Ensuring that the work performed is clear, concise, and executable by working with DOE-ID and the WAG 1 PM to establish firm project/task requirements
- Developing the project technical execution strategy and ensuring that cost-effective design solutions are developed in accordance with safety, environmental, and quality objectives

- Reviewing project status and variances and providing corrective actions
- Resolving conflicts regarding project requirements and project team members' comments on design, including defending and presenting design positions to the project team and the Agencies
- Coordinating all WAG 1 project designs with the engineering manager for TAN
- Being accountable to the WAG 1 PM for all cost and schedule performance of the assigned technical tasks and to the functions managers for the technical quality of a project's work products.

8.1.4 Operational Unit 1-10 Remedial Design/Remedial Action Project Manager

The Operational Unit (OU) 1-10 Remedial Design/Remedial Action project manager (RD/RA PM) is responsible to the WAG 1 PM for all work scope associated with the OU 1-10 project. In this capacity, the OU 1-10 RD/RA PM will perform many of the functions identified by the WAG 1 PM, as assigned by the WAG 1 PM.

The OU 1-10 RD/RA PM is responsible for the overall work scope, schedule, and budget for the OU 1-10 project, including such tasks as the following:

- Developing resource-loaded, time-phased control account plans based on the project's technical requirements, budgets, schedules, and project tasks for the OU 1-10 project
- Coordinating all document preparation, field, laboratory, and modeling activities for the OU 1-10 project
- Implementing the project requirements and ensuring that work is performed as planned for the OU 1-10 project.

8.1.5 Health and Safety Officer

The health and safety officer (HSO) assigned to the task site serves as the primary contact for all health and safety issues. The HSO advises the FTL on all aspects of health and safety, and is authorized to stop work at the site if any operation threatens worker or public health and/or safety. As appropriate, the HSO is authorized to verify compliance to the HASP to conduct conformance inspections and self-assessments, require and monitor corrective actions, and monitor decontamination procedures. The HSO may be assigned other specific responsibilities, as stated in other sections of the project HASP, as long as they do not interfere with the primary responsibilities.

Other ES&H professionals at the task site, such as the safety engineer (SE), IH, RCT, environmental coordinator, and facility representative, support the HSO as necessary.

Personnel assigned as the HSO, or alternate HSO, must be qualified (per the OSHA definition) to recognize and evaluate hazards, and will be given the authority to take or direct actions to ensure that workers are protected. While the HSO may also be the IH, SE, or, in some cases, the FTL (depending on the hazards, complexity, and size of the activity involved, and required concurrence from the ER safety and health compliance officer), other task-site responsibilities of the HSO must not conflict (philosophically or in terms of significant added volume of work) with the role of the HSO at the task site.

If it is necessary for the HSO to leave the site, an alternate individual will be appointed by the HSO to fulfill this role, and the identity of the acting HSO will be recorded in the FTL logbook and communicated to task-site personnel.

Note: *The HSO will ensure the appropriate Environmental, Safety, Health, and Quality Assurance personnel participate in the development and verification of the hazards screening profile checklist in accordance with relevant INEEL work control processes.*

8.1.6 Industrial Hygienist

The IH is the primary source of information regarding nonradiological hazardous and toxic agents at the work site. The IH will be present at the task site during any work operations involving either existing or anticipated chemical hazards to operations personnel.

The IH assesses the potential for worker exposure to hazardous agents in accordance with INEEL procedures and project HASP, assesses and recommends appropriate hazard controls for protection of work site personnel, reviews the effectiveness of monitoring and PPE required in the project HASP, and recommends changes as appropriate.

Note: *The IH will review all "Employee Job Function Evaluations," Form 340.02, to validate the management's completion of the form. After validation, the form is sent to the OMP for scheduling of a medical evaluation, as needed.*

Following an evacuation, the IH will assist in determining whether conditions at the task site are safe for reentry. Personnel showing health effects resulting from possible exposure to hazardous agents will be referred to the OMP by the IH, their supervisor, or the HSO. The IH may have other duties at the task site, as specified in other sections of the project HASP, or company procedures and manuals. During emergencies involving hazardous material, members of the Emergency Response Organization will perform IH measurements.

8.1.7 Safety Engineer

The assigned safety engineer (SE) reviews work packages, observes work site activity, assesses compliance with the project HASP, signs safe work permits, advises the FTL on required safety equipment, answers questions on safety issues and concerns, and recommends solutions to safety issues and concerns that arise at the task site. The SE may conduct periodic inspections, and have other duties at the task site as specified in other sections of the project HASP, or in PRDs and/or MCPs. Copies of inspections will be kept in the project field file.

8.1.8 Fire Protection Engineer

The assigned fire protection engineer reviews the work packages, conducts preoperational and operational fire hazard assessments, and is responsible for providing technical guidance to site personnel regarding all fire protection issues.

8.1.9 Radiological Control Technician

The radiological control technician (RCT) is the primary source of information and guidance on radiological hazards that may be encountered during drilling and sampling tasks. The RCT will be present at the task site during any work operations when a radiological hazard to operations personnel may exist or is anticipated. In addition to other possible duties at the site specified in other sections of the project

HASP, the PRDs, and/or MCPs, RCT responsibilities include radiological surveying of the work site, equipment, and samples; providing guidance for radiological decontamination of equipment and personnel; and accompanying the affected personnel to the nearest INEEL medical facility for evaluation if significant radiological contamination occurs.

The RCT must notify the HSO and FTL of any radiological occurrence that must be reported as directed by the INEEL *Radiological Control Manual* (PRD-183).

8.1.10 Test Area North Nuclear Facilities Manager

The TAN nuclear facilities manager is responsible for maintaining the assigned facility and must be cognizant of work being conducted in the facility. The TAN nuclear facilities manager is responsible for the safety of personnel and the safe completion of all project activities conducted within the area in accordance with the area director concept.

The TAN nuclear facilities manager and the site area director responsible for TAN will be kept informed of all activities performed in the area. The TAN nuclear facilities manager and FTL will agree on a schedule for reporting work progress and plans for work. The TAN nuclear facilities manager may also serve as an advisor to task-site personnel with regard to TAN operations.

8.1.11 Quality Assurance Engineer

The quality assurance (QA) engineer provides guidance on task-site quality issues, when requested. The QA engineer observes task site activities, verifies that these operations comply with quality requirements pertaining to these activities, identifies activities that do not comply or have the potential for not complying with quality requirements, and suggests corrective actions.

8.1.12 WAG 1 Regulatory Support

The assigned WAG 1 Regulatory Support representative oversees, monitors, and advises the PM and FTL on environmental issues and concerns regarding task-site activities, and is responsible for:

- Ensuring compliance with DOE orders, EPA regulations, and other regulations concerning the effects of task-site activities on the environment

- Providing support surveillance for hazardous waste storage and transport, and for surface water/storm water runoff control

- Assisting the PE in completing the Hazards Profile Screening Checklist.

8.1.13 Sample Management Office

The INEEL Sample Management Office (SMO) will obtain necessary laboratory services, as required, ensure that data generated from samples collected and analyzed meet the needs of the project by validating all analytical laboratory data according to resident protocol, and ensure that data are reported to the project personnel in a timely fashion, as required by the FFA/CO.

The assigned SMO representative is responsible for:

- Interfacing with the PM and/or his designee during the preparation of the SAP database, as required by PRD-5030/MCP-3480/MCP-3653, "Sampling and Analysis Process for CERCLA and D&D&D Activities."

- Providing guidance on the appropriate number of field quality control samples required by the QAPjP (DOE-ID 2002a)

- Providing guidance on the appropriate bottle size and preservation method(s) for sample collection

- Ensuring the sample identification numbers used by the project are unique from all others ever assigned by the IEDMS.

The preparation of the SAP database, along with the completion of the SMO services request form (INEEL Form 435.26), initiates the sample and sample waste tracking activities performed by the SMO.

The SMO-contracted laboratory will have overall responsibility for laboratory technical quality, laboratory cost control, laboratory personnel management, and adherence to agreed-upon laboratory schedules. Responsibilities of the laboratory personnel include preparing analytical reports, ensuring completion of chain-of-custody information, and ensuring all QA/QC procedures are implemented in accordance with SMO generated TOSs and master task agreements.

8.1.14 Integrated Environmental Data Management System Technical Leader

The IEDMS technical leader will interface with the PM during the preparation of the IEDMS Database required by PRD-5030/MCP-3480/MCP-3653, "Sampling and Analysis Process for CERCLA and D&D&D Activities." This individual also provides guidance on the appropriate number of field quality control samples required by the QAPjP (DOE-ID 2002a) and the appropriate bottle size and preservation for sample collection, and ensures the sample identification numbers used by the project are unique from all others ever assigned by IEDMS.

The preparation of the plan database, along with completion of the SMO request for services form, initiates the sample and sample waste tracking activities performed by the SMO.

8.1.15 Field Team Leader

The field team leader (FTL) has ultimate responsibility for the safe and successful completion of the sampling project, and all health and safety issues at the work site must be brought to the FTL's attention. In addition to managing field operations, executing the FSP, enforcing site control, documenting work site activities, and conducting daily safety briefings, the FTL's responsibilities include, but are not limited to, the following:

- Performing the technical and operational requirements of the sampling activities

- Conducting field analysis and decontamination activities

- Complying with equipment removal procedures

- Packaging and shipping samples

- Determining, in conjunction with the site IH and RCT, the level of PPE necessary for the task being performed

- Ensuring compliance with field documentation, sampling methods, and chain-of-custody requirements

- Ensuring the safety of personnel conducting the activities associated with the FSP

- Ensuring the "fit for duty" medical evaluation forms are completed for all project employees, reviewed by the project IH for validation, and then incorporated into the project field file.

The FTL may be a member of the sampling team and FTL responsibilities may be transferred to a designated representative who satisfies all FTL training requirements.

8.1.16 Field Team Members

All field team members, including field team, sampling team, and subcontractor personnel, will understand and comply with the requirements of the project HASP. The FTL or HSO will conduct a plan of the day (POD) briefing at the start of each shift. During the POD briefing, all daily tasks, associated hazards, hazard mitigation (engineering and administrative controls, required PPE, work control documents), and emergency conditions and actions will be discussed. The project HSO, IH, and RCT personnel will provide input to clarify task health and safety requirements, as deemed appropriate. All personnel are encouraged to ask questions regarding site tasks and to provide suggestions for performing required tasks in a more safe and effective manner based on the lessons learned from the previous day's activities.

Once at the site, personnel are responsible for identifying any potentially unsafe situations or conditions to the FTL or HSO for corrective action. **If it is perceived that an unsafe condition poses an imminent danger, site personnel are authorized to stop work immediately, then notify the FTL or HSO of the unsafe condition.**

8.1.17 Sampling Team Leader

The sampling team leader (STL) reports to the FTL and has ultimate responsibility for the safe and successful completion of assigned project tasks, including:

- Overseeing the sampling team

- Ensuring that the samples are collected from appropriate locations

- Ensuring that proper sampling methods are employed, chain-of-custody procedures are followed, and shipping requirements are met.

If the STL leaves the task site, an alternate individual will be appointed to act in this capacity. An acting STL on the task site must meet all the same training requirements as the FTL, as outlined in the project HASP. The identity of the acting STL shall be conveyed to task-site personnel, recorded in the daily force report, and communicated to the FTL and TAN Site Area Director, or designee, when appropriate. The STL may also be the FTL for the sampling event.

8.1.18 Sampling Team

The sampling team will consist of a minimum of two members (including the STL) who will perform the onsite tasks necessary to collect the samples. The buddy system will be implemented for all tasks, and no team member will enter the contamination zone alone. The members of the sampling team will be led by an FTL, who may also serve as the project STL. The IH and RCT will support the sampling team, as warranted, based on sight-specific hazards and task evolutions.

8.1.19 Construction Coordinator

The construction coordinator is responsible for field implementation of the project, which includes:

- Ensuring that all field tasks receive appropriate heath and safety review prior to commencing

- Confirming that the necessary equipment and facilities to implement the provisions of this FSP are made available

- Reporting the project status to the WAG 1 PE.

The construction coordinator reports to the WAG 1 PM and may delegate any or all of the above responsibilities.

8.1.20 Drilling and Excavation Subcontractors

The drilling and excavation subcontractors will perform all drilling and soil excavation tasks as required during this project. Each subcontractor will have a lead or foreman who serves as the single point of contact for all subcontractor safety issues at the site. The subcontractor foreman will supervise subcontractor personnel assigned to work at the site, and report to the FTL on all field interface issues. Each foreman will work with the FTL to accomplish daily drilling operations at the site, identify and obtain additional resources needed at the site, and interact with the HSO, IH, SE, and RCT on matters regarding health and safety. Each subcontractor foreman will report any health and safety issues that arise at the site to the HSO or FTL and may stop work at the site if an unsafe condition exists. They will also be asked to provide hazard and mitigation information regarding the nature of the drilling tasks during the POD meeting.

8.1.21 Nonfield Team Members/Visitors

All persons on the work site who are not part of the field team (e.g., surveyor, equipment operator, or other craft personnel not assigned to the project) are considered nonfield team members or visitors for the purposes of this project. A person will be considered "onsite" when they are present in or beyond the designated support zone. Per 29 CFR 1910.120 and 29 CFR 1926.65, nonfield team members are considered occasional site workers and must comply with the following:

- Receive any additional site-specific training identified in the HASP prior to entering beyond the support zone of the project site

- Meet all required training based on the tasks taking place, as identified in the HASP

- Meet minimum training requirements for such workers as described in the OSHA standard

- Meet the same training requirements as the workers if the nonworker's tasks require entry into the work control zone.

Training must be documented and a copy of the documentation must be incorporated into the project field file. A site supervisor (e.g., HSO or FTL) will supervise all nonfield team personnel who have not completed their three days of supervised field experience, in accordance with the Hazardous Waste Operations (HAZWOPER) standard.

> **Note:** *Nonfield team members/visitors may not be allowed beyond the support zone during certain project site tasks (drilling) to minimize safety and health hazards. The determination as to any visitor's "need" for access beyond the support zone at the project site will be made by the HSO in consultation with TAN Radiological Control (RadCon) personnel (as appropriate).*

8.2 Points of Contact

Table 8-1 lists the key points of contact for the TAN, WAG 1, OU 1-10 field activities conducted at the Soil Contamination Area South of the Turntable (TSF-06, Area B) and the PM-2A Tanks (TSF-26). The points of contact listed in the table are those expected to be contacted as a part of sampling operations. This table is subject to change due to reassignment of personnel. A current copy of this table will be posted at the job site for reference during all project activities. Revisions to this table will not require a DAR because the current job positions will be posted at the job site.

Table 8-1. Points of contact.

Name	Title	Telephone Number
Al Jantz	WAG 1 Project Manager	(208) 526-8517
Dave Eaton	WAG 1 Regulatory Support	(208) 526-7002
Gary McDannel	WAG 1 Project Engineer	(208) 526-5076
Jim Bruce	OU 1-10 RD/RA Project Manager	(208) 526-4370
Todd Lewis	Health and Safety Officer	(208) 526-6856
TBD	Field Team Leader	TBD
TBD	Industrial Hygienist	TBD
TBD	Safety Engineer	TBD
TBD	Fire Protection Engineer	TBD
TBD	Radiological Control Technician	TBD
Kevin Streeper	TAN Nuclear Facilities Manager	(208) 526-6151
Bob Thompson	QA Engineer	(208) 526-9618
TBD	Construction Coordinator	TBD
Donna Kirchner	Sample Management Office Contact	(208) 526-9873

TBD = to be determined

9. REFERENCES

29 CFR 1910.120, 2001, Title 29, "Labor," Part 1910, "Occupational Safety and Health Standards," Section 1910.120, "Hazardous Waste Operations and Emergency Response," *Code of Federal Regulations,* Office of the Federal Register, July 1, 2001.

29 CFR 1926.65, 2001, Title 29, "Labor," Part 1926, "Safety and Health Regulations for Construction," Section 1926.65, "Hazardous Waste Operations and Emergency Response," *Code of Federal Regulations*, Office of the Federal Register, July 1, 2001.

40 CFR 262.11, 2002, Title 40, "Protection of the Environment," Part 262, "Standards Applicable to Generators of Hazardous Waste," Section 262.11, "Hazardous Waste Determination," *Code of Federal Regulations*, Office of the Federal Register, July 1, 2002.

40 CFR 264.1, 2002, Title 40, "Protection of the Environment," Part 264, "Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities," Section 264.1, "Purpose, Scope and Applicability," *Code of Federal Regulations,* Office of the Federal Register, July 1, 2002.

49 CFR 171, 2002, Title 49, "Transportation," Part 171, "General Information, Regulations, and Definitions," *Code of Federal Regulations,* Office of the Federal Register, October 1, 2002.

49 CFR 172, 2002, Title 49, "Transportation," "Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements," *Code of Federal Regulations*, Office of the Federal Register, October 1, 2002.

49 CFR 173, 2002, Title 49, "Transportation," Part 173, "Shippers—General Requirements For Shipments and Packagings," *Code of Federal Regulations*, Office of the Federal Register, October 1, 2002.

49 CFR 174, 2002, Title 49, "Transportation," Part 174, "Carriage by Rail," *Code of Federal Regulations*, Office of the Federal Register, October 1, 2002.

49 CFR 175, 2002, Title 49, "Transportation," Part 175, "Carriage by Aircraft," *Code of Federal Regulations*, Office of the Federal Register, October 1, 2002.

49 CFR 176, 2002, Title 49, "Transportation," Part 176, "Carriage by Vessel," *Code of Federal Regulations*, Office of the Federal Register, October 1, 2002.

49 CFR 177, 2002, Title 49, "Transportation," Part 177, "Carriage by Public Highway," *Code of Federal Regulations*, Office of the Federal Register, October 1, 2002.

49 CFR 178, 2002, Title 49, "Transportation," Part 178, "Specifications for Packagings," *Code of Federal Regulations*, Office of the Federal Register, October 1, 2002.

54 FR 48184, "National Priorities List of Uncontrolled Hazardous Waste Sites; Final Rule," *Federal Register*, Environmental Protection Agency, November 21, 1989.

DOE-ID, 1991, *Federal Facility Agreement and Consent Order for the Idaho National Engineering Laboratory*, Department of Energy Idaho Operations Office, U.S. Environmental Protection Agency Region 10, State of Idaho Department of Health and Welfare, December 1991.

DOE-ID, 1997, *Comprehensive Remedial Investigation/Feasibility Study for the Test Area North Operable Unit 1-10 at the Idaho National Engineering and Environmental Laboratory*, DOE/ID-10557, Revision 0, U.S. Department of Energy Idaho Operations Office, November 1997.

DOE-ID, 1998, *Proposed Plan for Waste Area Group 1 – Test Area North Idaho National Engineering and Environmental Laboratory*, Document Number 10553, U.S. Department of Energy Idaho Operations Office, U.S. Environmental Protection Agency Region 10, Idaho Department of Health and Welfare, Division of Environmental Quality, Idaho Falls, Idaho, November 1998.

DOE-ID, 1999a, *Final Record of Decision, Test Area North, Operable Unit 1-10*, DOE/ID-10682, Revision 0, U.S. Department of Energy Idaho Operations Office, December 1999.

DOE-ID, 1999b, *Final Record of Decision, Idaho Nuclear Technology and Engineering Center, Operable Unit 3-13*, DOE/ID-10660, Revision 0, U.S. Department of Energy Idaho Operations Office, October 1999.

DOE-ID, 2000a, *Remedial Design/Remedial Action Work Plan for Group 1 Tank Farm Interim Action*, DOE/ID 10772, Revision 0, U.S. Department of Energy Idaho Operations Office, September 2000.

DOE-ID, 2000b, *Field Sampling Plan for Post-Record of Decision Sampling and Field Screening of Selected Sites at Waste Area Group 1, Operable Unit 1-10,* DOE/ID-10710, Revision 0, U.S. Department of Energy Idaho Operations Office, February 2000.

DOE-ID, 2001, *Idaho National Engineering Laboratory Reusable Property, Recyclable Materials, and Waste Acceptance Criteria*, DOE/ID-01-10381, Revision 16, U.S. Department of Energy Idaho Operations Office, December 2002.

DOE-ID, 2002a, *Quality Assurance Project Plan for Waste Area Group 1, 2, 3, 4, 5, 6, 7, 10, and Inactive Sites*, DOE/ID-10587, Rev. 7, U.S. Department of Energy Idaho Operations Office, September 2002.

DOE-ID, 2002b, *Waste Acceptance Criteria for ICDF Landfill*, U.S. Department of Energy Idaho Operations Office, DOE/ID-10865, Revision 2, May 2002.

DOE O 435.1, 2001, "Radioactive Waste Management," U.S. Department of Energy, August 28, 2001.

EG&G, 1983, *Final Report Decontamination and Decommissioning of TAN Radioactive Liquid Waste Evaporator System (PM-2A)*, EGG-2236, Idaho National Engineering Laboratory, EG&G Idaho, March 1983.

EPA, 1988, *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA*, OSWER Directive 9355.3-01, U.S. Environmental Protection Agency, 1988.

EPA, 1990, *National Oil and Hazardous Substances Contingency Plan*, Federal Register, U.S. Environmental Protection Agency, Volume 55.

EPA, 1994, *Guidance for the Data Quality Objectives Process*, EPA QA-G-4, Office of Research and Development, EPA/600/R-96/055, Environmental Protection Agency, September 1994.

EPA, 2000, *Data Quality Objective Process for Hazardous Waste Site Investigations*, EPA-QA/G-4HW, EPA/600/R-00/007, Environmental Protection Agency, January 2000.

Form 340.02, 2002, “Employee Job Function Evaluation Form,” Rev. 9, August 8, 2002.

Form 435.26, 2001, “SMO/WGS Services Request Form,” Rev. 13, March 5, 2001.

INEEL, 1994, *Preliminary Scoping Track 2 Summary Report for the Test Area North Operable Unit 1-05: Radioactive Contamination Sites*, INEL-94/0135, Revision 0, Idaho National Engineering and Environmental Laboratory, October 1994.

INEEL, 2002a, *WRRTF-13 Calendar Year 2000 Sampling and Risk Based Corrective Action Analysis Summary Report*, INEEL/EXT-02-01137, Revision O, Idaho National Engineering and Environmental Laboratory, October 2002.

INEEL, 2002b, *TSF-06 and TSF-26 Calendar Year 2000 Sampling and Remediation Summary Report for Waste Area Group 1, Operable Unit 1-10,* INEEL/EXT-02-01135, Revision 0, Idaho National Engineering and Environmental Laboratory, October 2002.

MCP-227, 1999, “Sampling and Analysis Process for CERCLA and D&D&D Activities,” Revision 9, Idaho National Engineering and Environmental Laboratory, Idaho Falls, Idaho, April 2002.

MCP-233, 2002, “Process for Developing, Releasing, and Distributing ER Documents, (Supplemental to MCP-135 and MCP-9395),” Revision 4, Idaho National Engineering and Environmental Laboratory, Idaho Falls, Idaho, June 2002.

MCP-241, 1998, “Preparation of Characterization Plans,” Revision 4, Idaho National Engineering and Environmental Laboratory, Idaho Falls, Idaho, November 2002.

MCP-3475, 2002, “Temporary Storage of CERCLA Generated Waste at the INEEL,” Revision 2, Idaho National Engineering and Environmental Laboratory, Idaho Falls, Idaho, May 2002.

PRD-183, 2000, “Radiation Protection-INEEL Radiological Control Manual,” Revision 6, Companywide Manual 15A, Radiological Control, Idaho National Engineering and Environmental Laboratory, Idaho Falls, Idaho, July 2000.

PRD-5030/MCP-3480/MCP-3653, 2002, “Environmental Requirements for Facilities, Processes, Materials, and Equipment,” Revision 8, Idaho National Engineering and Environmental Laboratory, Idaho Falls, Idaho, November 2002.

TPR-4908, 2002, “Handling and Shipping Samples for ER and D&D&D Projects,” Revision 0, Idaho National Engineering and Environmental Laboratory, Idaho Falls, Idaho, July 2002.

TPR-4910, 2002, “Logbook Practices for ER and D&D&D,” Rev. 0, Idaho National Engineering and Environmental Laboratory, Idaho Falls, Idaho, May 2002.

TPR-4913, 2002, “Chain of Custody and Sample Labeling for ER and D&D&D Projects,” Revision 0, Idaho National Engineering and Environmental Laboratory, Idaho Falls, Idaho, July 2002.

Quantrad Sensor, 1997, Scout/Scoutmaster User’s Guide, Version 1.15.